

FIG. 1

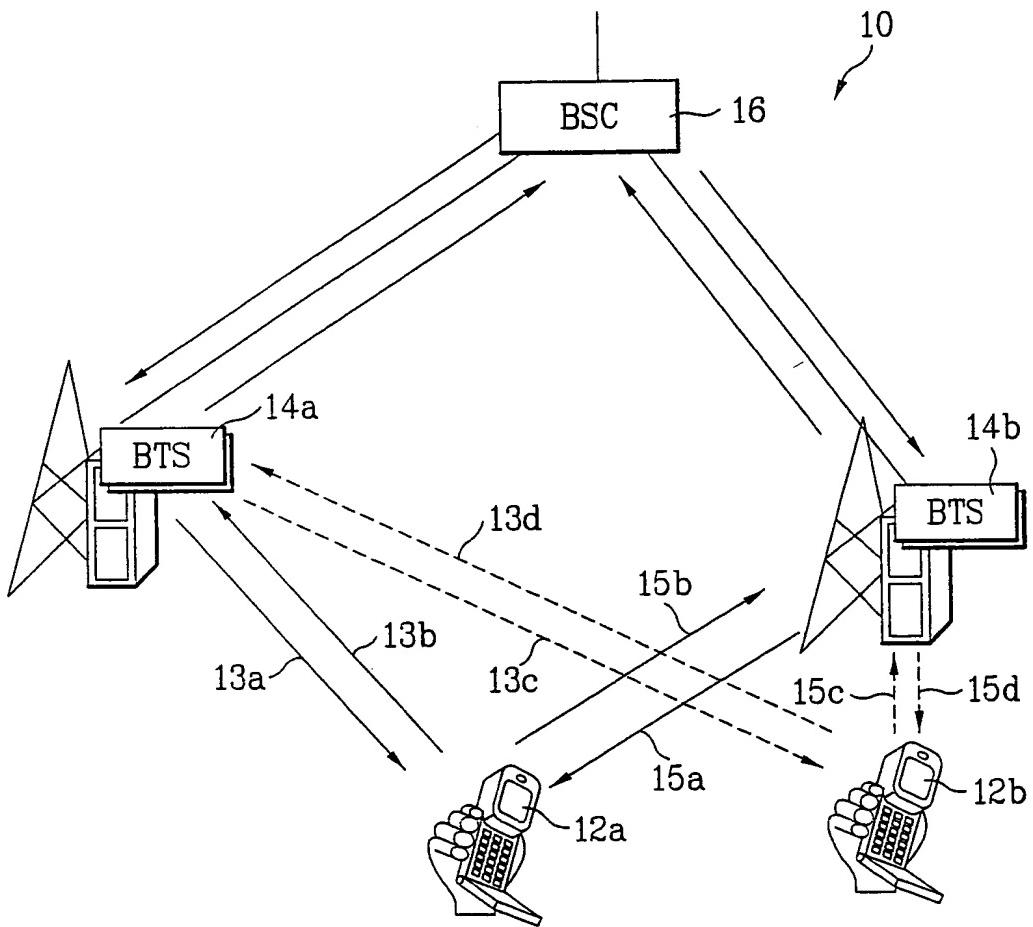


FIG. 2

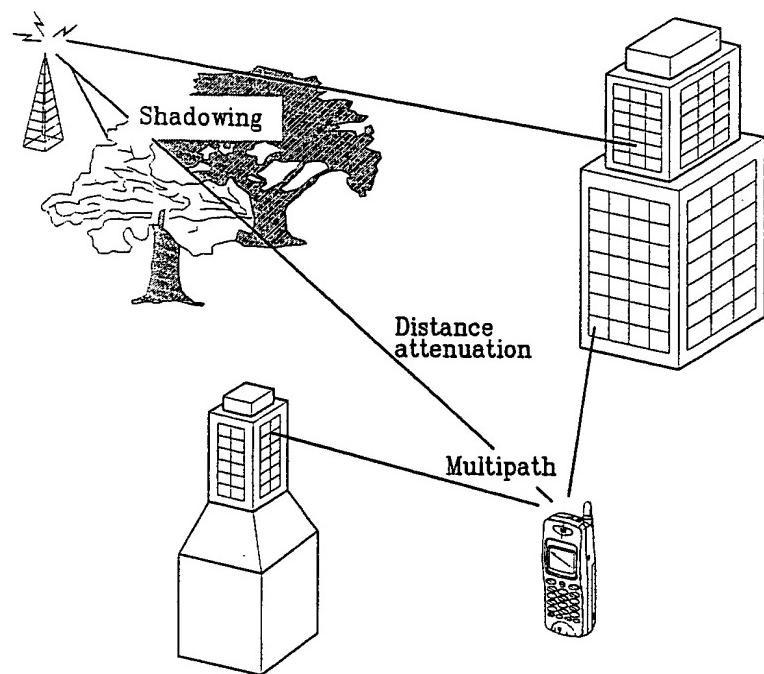


FIG. 3

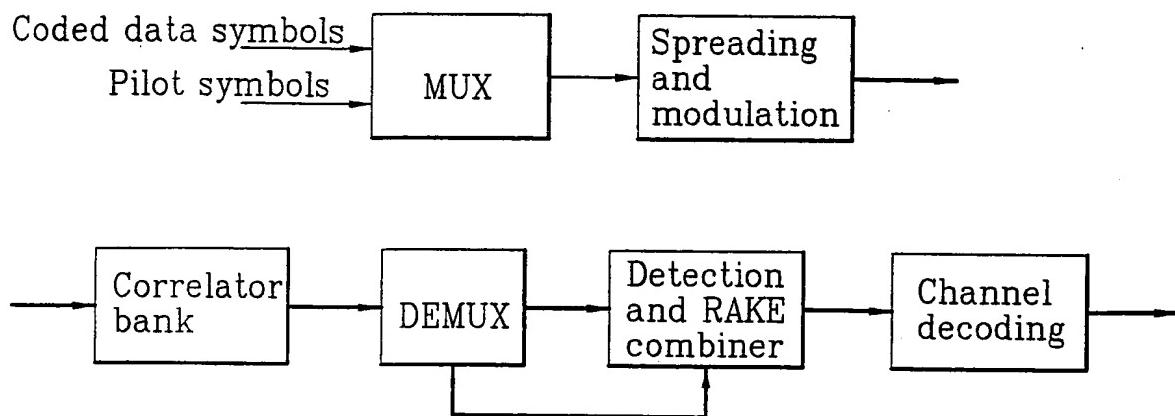
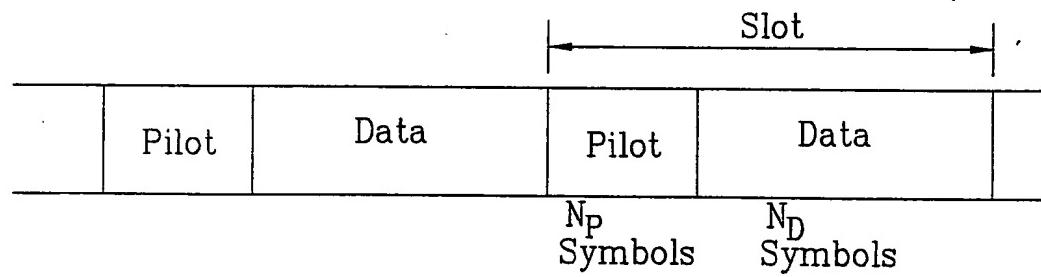


FIG. 4

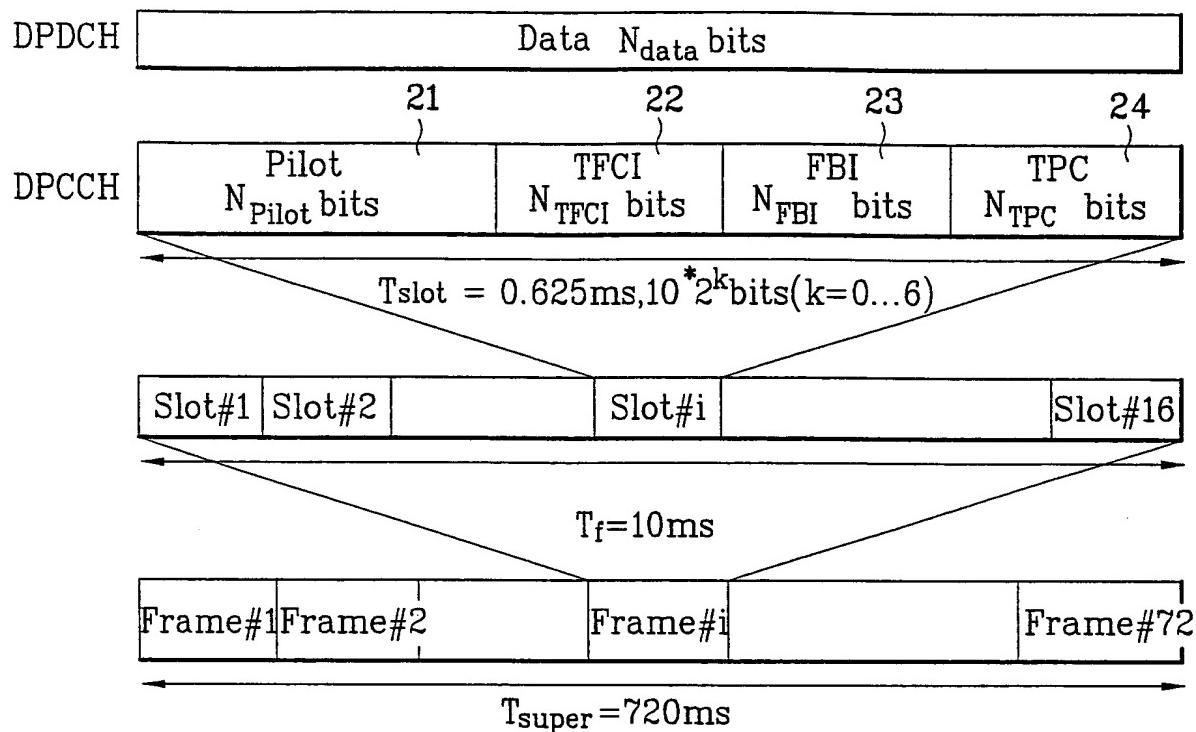


FIG. 5

| Channel Bit Rate(kbps) | Channel Symbol Rate(ksps) | SF | Bits/Frame | Bits/Slot | N _{pilot} | N _{TPC} | N _{TFCI} | N _{FBI} |
|------------------------|---------------------------|-----|------------|-----------|--------------------|------------------|-------------------|------------------|
| 16 | 16 | 256 | 160 | 10 | 6 | 2 | 2 | 0 |
| 16 | 16 | 256 | 160 | 10 | 8 | 2 | 0 | 0 |
| 16 | 16 | 256 | 160 | 10 | 5 | 2 | 2 | 1 |
| 16 | 16 | 256 | 160 | 10 | 7 | 2 | 0 | 1 |
| 16 | 16 | 256 | 160 | 10 | [6] | [2] | [0] | [2] |
| 16 | 16 | 256 | 160 | 10 | [5] | [1] | [2] | [2] |

FIG. 6

| | Npilot=6 | | | | | | Npilot=8 | | | | | | | |
|---------|----------|---|---|---|---|---|----------|---|---|---|---|---|---|---|
| Bit # | 0 | 1 | 2 | 3 | 4 | 5 | 0 | 1 | 2 | 3 | 4 | 5 | 6 | 7 |
| slot #1 | 1 | 1 | 1 | 1 | 1 | 1 | 1 | 1 | 1 | 1 | 1 | 1 | 1 | 1 |
| 2 | 1 | 1 | 1 | 1 | 0 | 1 | 1 | 1 | 1 | 1 | 0 | 1 | 1 | |
| 3 | 1 | 0 | 1 | 1 | 0 | 1 | 1 | 0 | 1 | 1 | 1 | 0 | 1 | 1 |
| 4 | 1 | 1 | 0 | 1 | 0 | 1 | 1 | 1 | 1 | 0 | 1 | 0 | 1 | 1 |
| 5 | 1 | 1 | 0 | 1 | 1 | 1 | 1 | 1 | 1 | 0 | 1 | 1 | 1 | 1 |
| 6 | 1 | 1 | 0 | 1 | 1 | 1 | 1 | 1 | 1 | 0 | 1 | 1 | 1 | 1 |
| 7 | 1 | 0 | 1 | 1 | 0 | 0 | 1 | 0 | 1 | 1 | 1 | 0 | 1 | 0 |
| 8 | 1 | 1 | 0 | 1 | 0 | 1 | 1 | 1 | 1 | 0 | 1 | 0 | 1 | 1 |
| 9 | 1 | 1 | 1 | 1 | 0 | 0 | 1 | 1 | 1 | 1 | 1 | 0 | 1 | 0 |
| 10 | 1 | 0 | 1 | 1 | 0 | 1 | 1 | 0 | 1 | 1 | 1 | 0 | 1 | 1 |
| 11 | 1 | 1 | 1 | 1 | 1 | 0 | 1 | 1 | 1 | 1 | 1 | 1 | 1 | 0 |
| 12 | 1 | 0 | 1 | 1 | 0 | 1 | 1 | 0 | 1 | 1 | 1 | 0 | 1 | 1 |
| 13 | 1 | 0 | 0 | 1 | 0 | 1 | 1 | 0 | 1 | 0 | 1 | 0 | 1 | 1 |
| 14 | 1 | 1 | 0 | 1 | 0 | 0 | 1 | 1 | 1 | 0 | 1 | 0 | 1 | 0 |
| 15 | 1 | 0 | 1 | 1 | 0 | 0 | 1 | 0 | 1 | 1 | 1 | 0 | 1 | 0 |
| 16 | 1 | 0 | 0 | 1 | 0 | 0 | 1 | 0 | 1 | 0 | 1 | 0 | 1 | 0 |

FIG. 7

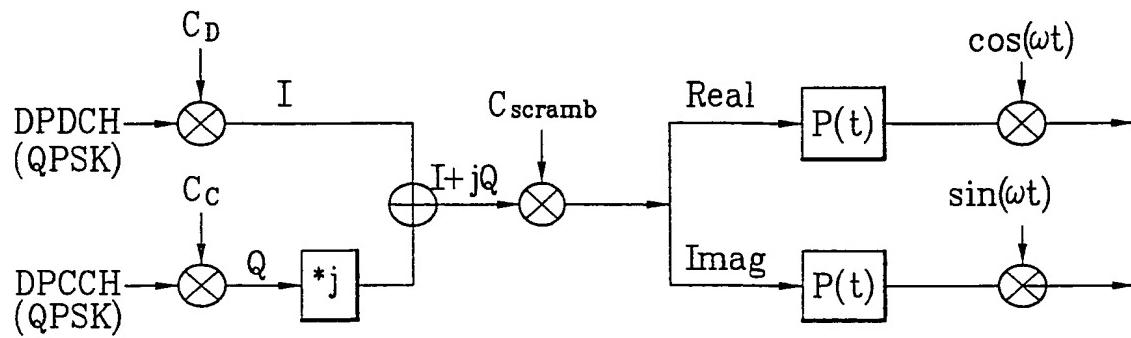


FIG. 8

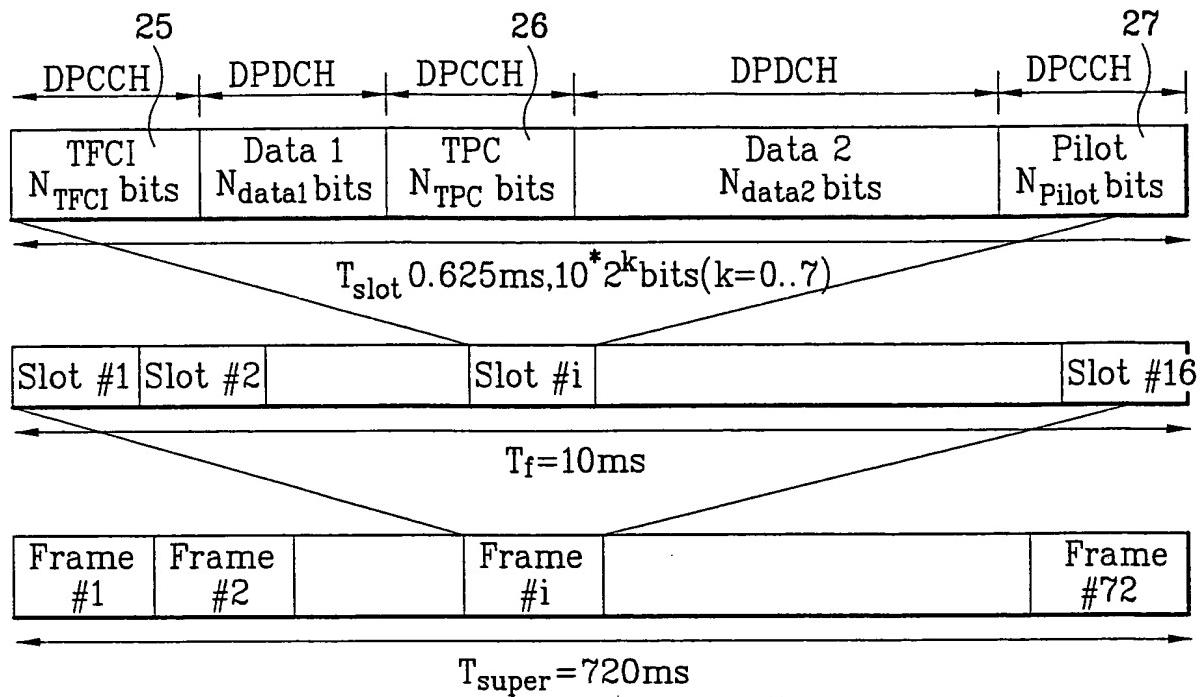


FIG. 9

| Symbol rate | 8ksps | | 16,32,64,128ksps | | | | 256,512,1024ksps | | | | | | | |
|-------------|-------|----|------------------|----|----|----|------------------|----|----|----|----|----|----|----|
| Symbol # | 0 | 1 | 0 | 1 | 2 | 3 | 0 | 1 | 2 | 3 | 4 | 5 | 6 | 7 |
| Slot #1 | 11 | 11 | 11 | 11 | 11 | 11 | 11 | 11 | 11 | 11 | 11 | 11 | 11 | 10 |
| 2 | 11 | 11 | 11 | 11 | 11 | 01 | 11 | 10 | 11 | 10 | 11 | 10 | 11 | 01 |
| 3 | 11 | 10 | 11 | 01 | 11 | 01 | 11 | 10 | 11 | 01 | 11 | 11 | 11 | 01 |
| 4 | 11 | 01 | 11 | 10 | 11 | 01 | 11 | 11 | 11 | 01 | 11 | 00 | 11 | 10 |
| 5 | 11 | 10 | 11 | 10 | 11 | 11 | 11 | 11 | 11 | 00 | 11 | 01 | 11 | 10 |
| 6 | 11 | 10 | 11 | 10 | 11 | 11 | 11 | 11 | 11 | 11 | 01 | 11 | 11 | 10 |
| 7 | 11 | 01 | 11 | 01 | 11 | 00 | 11 | 10 | 11 | 11 | 11 | 01 | 11 | 10 |
| 8 | 11 | 00 | 11 | 10 | 11 | 01 | 11 | 01 | 11 | 00 | 11 | 10 | 11 | 00 |
| 9 | 11 | 00 | 11 | 11 | 11 | 00 | 11 | 11 | 11 | 10 | 11 | 00 | 11 | 01 |
| 10 | 11 | 10 | 11 | 01 | 11 | 01 | 11 | 01 | 11 | 11 | 11 | 11 | 11 | 00 |
| 11 | 11 | 10 | 11 | 11 | 11 | 10 | 11 | 10 | 11 | 10 | 11 | 11 | 11 | 10 |
| 12 | 11 | 11 | 11 | 01 | 11 | 01 | 11 | 01 | 11 | 10 | 11 | 10 | 11 | 00 |
| 13 | 11 | 10 | 11 | 00 | 11 | 01 | 01 | 11 | 10 | 11 | 01 | 11 | 11 | 10 |
| 14 | 11 | 11 | 11 | 10 | 11 | 00 | 11 | 00 | 11 | 10 | 11 | 10 | 11 | 00 |
| 15 | 11 | 00 | 11 | 01 | 11 | 00 | 11 | 01 | 11 | 10 | 11 | 00 | 11 | 00 |
| 16 | 11 | 00 | 11 | 00 | 11 | 00 | 11 | 10 | 11 | 00 | 11 | 00 | 11 | 00 |

FIG. 10

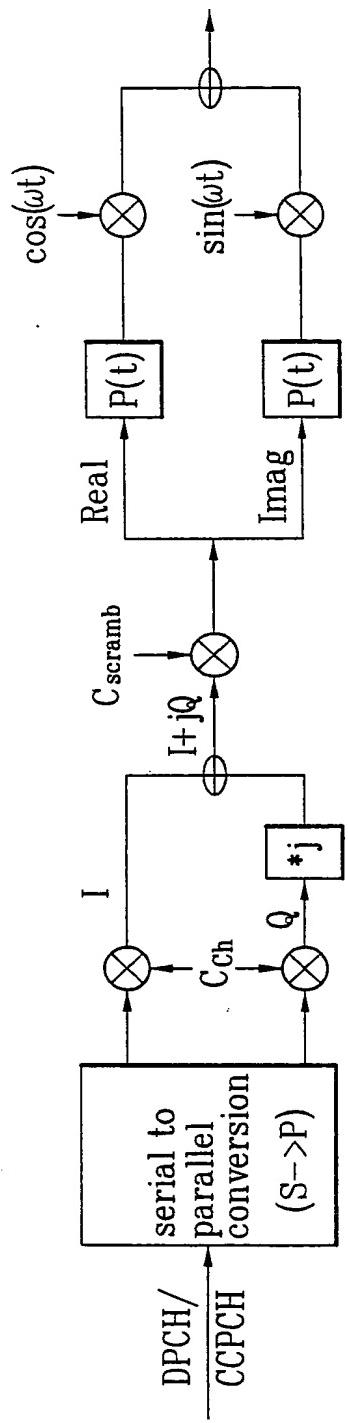


FIG. 11A

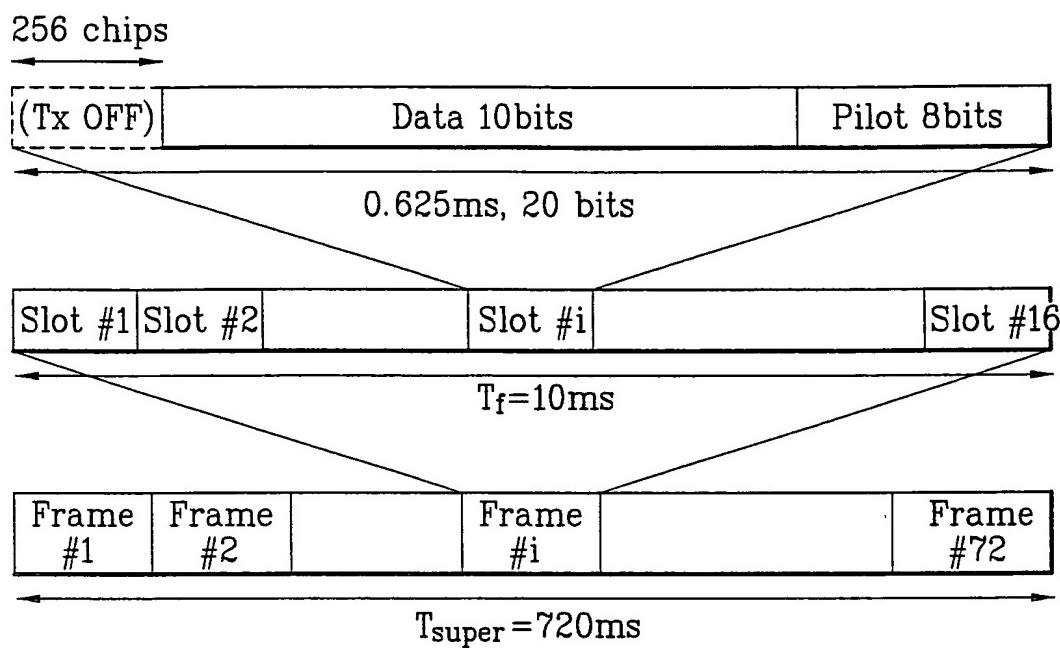


FIG. 11B

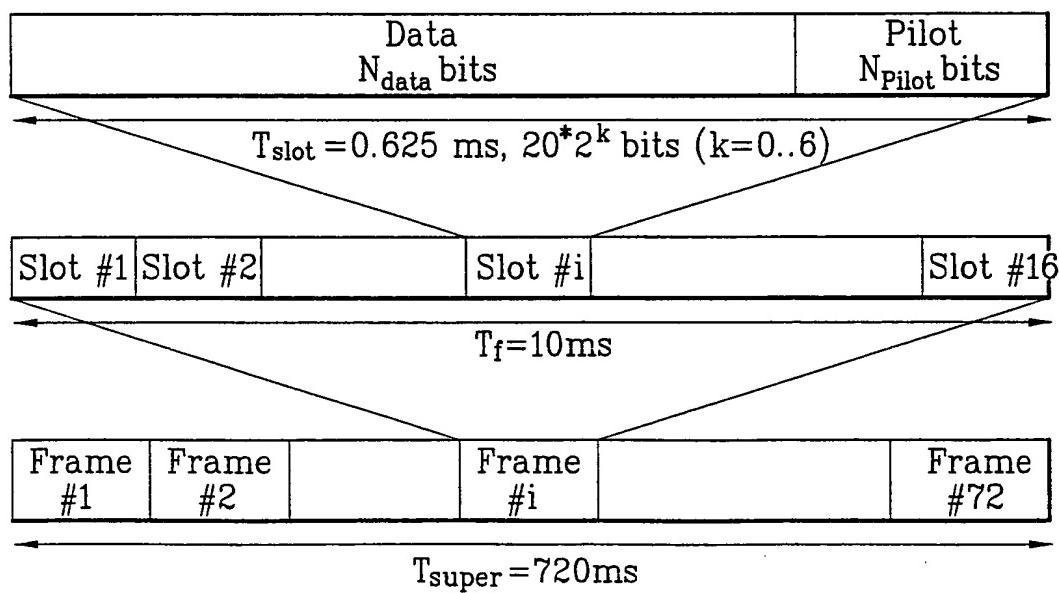
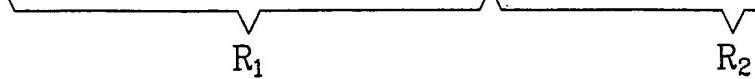


FIG. 12A

| Frame Synchronization Words | | | | | | | | | | | | | | |
|--|---|---|---|---|---|-------|---|--|--|--|--|--|--|--|
| Slot Number | 1 | 2 | 3 | 4 | 5 | | L | | | | | | | |
| $C_1 = (1\ 1\ 0\ 1\ 1\ 1\ 1\ 0\ 0\ 1\ 0\ 0\ 0\ 0\ 0)$ | | | | | | | | | | | | | | |
| $C_2 = (1\ 0\ 0\ 0\ 1\ 0\ 1\ 0\ 0\ 1\ 1\ 1\ 0\ 1\ 0\ 1)$ | | | | | | | | | | | | | | |
| $C_3 = (1\ 1\ 0\ 1\ 1\ 1\ 0\ 0\ 0\ 0\ 1\ 0\ 0\ 0\ 1\ 1)$ | | | | | | | | | | | | | | |
| $C_4 = (0\ 1\ 1\ 1\ 0\ 1\ 1\ 0\ 1\ 0\ 0\ 0\ 1\ 0\ 0\ 1)$ | | | | | | | | | | | | | | |
| $C_5 = (1\ 0\ 1\ 1\ 0\ 0\ 0\ 0\ 0\ 1\ 0\ 0\ 1\ 1\ 1\ 1)$ | | | | | | | | | | | | | | |
| $C_6 = (1\ 1\ 1\ 0\ 0\ 1\ 0\ 1\ 0\ 0\ 0\ 1\ 1\ 0\ 1\ 0)$ | | | | | | | | | | | | | | |
| $C_7 = (0\ 1\ 0\ 0\ 0\ 0\ 1\ 1\ 1\ 0\ 1\ 1\ 1\ 1\ 0\ 0)$ | | | | | | | | | | | | | | |
| $C_8 = (1\ 1\ 1\ 0\ 1\ 0\ 0\ 1\ 0\ 0\ 0\ 1\ 0\ 1\ 1\ 0)$ | | | | | | | | | | | | | | |

FIG. 12B

| $R(\tau)$ | τ | 0 | 1 | 2 | 3 | 4 | 5 | 6 | 7 | 8 | 9 | 10 | 11 | 12 | 13 | 14 | 15 |
|-------------|--------|----|---|----|---|----|---|----|-----|----|---|----|----|----|----|----|----|
| $R_E(\tau)$ | 16 | 4 | 0 | 4 | 0 | -4 | 0 | -4 | -16 | -4 | 0 | -4 | 0 | 4 | 0 | 4 | |
| $R_F(\tau)$ | 16 | -4 | 0 | -4 | 0 | 4 | 0 | 4 | -16 | 4 | 0 | 4 | 0 | -4 | 0 | -4 | |
| $R_G(\tau)$ | 16 | 4 | 0 | -4 | 0 | 4 | 0 | -4 | -16 | -4 | 0 | 4 | 0 | -4 | 0 | 4 | |
| $R_H(\tau)$ | 16 | -4 | 0 | 4 | 0 | -4 | 0 | 4 | -16 | 4 | 0 | -4 | 0 | 4 | 0 | -4 | |



 R_1 R_2

FIG. 13A

$$R_E(\tau) + R_F(\tau), \text{ or } (R_G(\tau) + R_H(\tau))$$

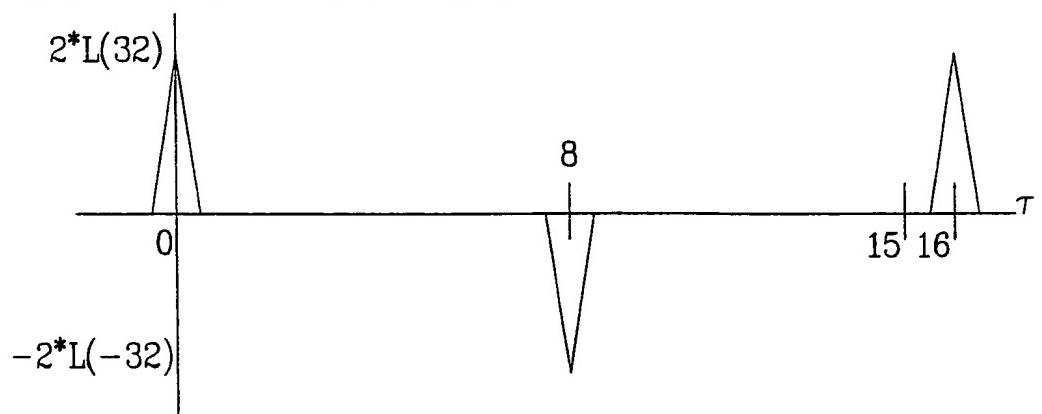


FIG. 13B

$$R_E(\tau) + R_F(\tau), + (R_G(\tau) + R_H(\tau))$$

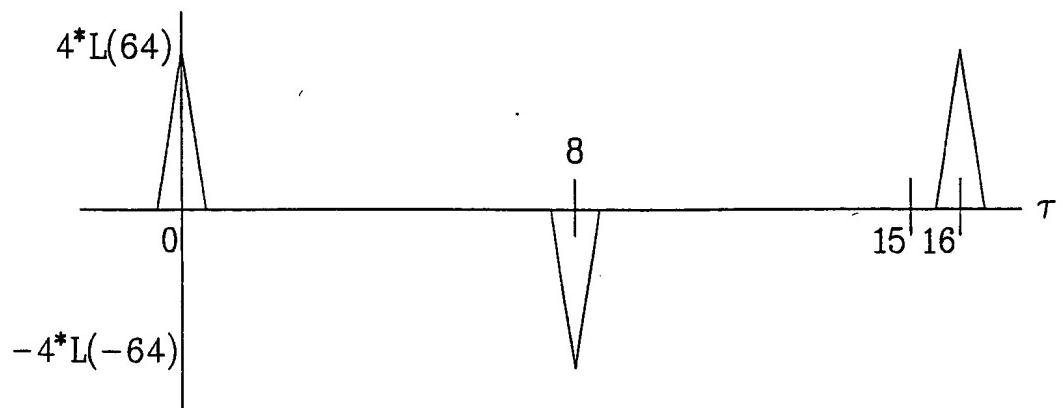


FIG. 14A

| Bit # | N _{pilot} = 5 | | | | | N _{pilot} = 6 | | | | | |
|---------|------------------------|---|---|---|---|------------------------|---|---|---|---|---|
| | 0 | 1 | 2 | 3 | 4 | 0 | 1 | 2 | 3 | 4 | 5 |
| Slot #1 | 1 | 1 | 1 | 1 | 0 | 1 | 1 | 1 | 1 | 1 | 0 |
| 2 | 1 | 0 | 1 | 1 | 1 | 1 | 1 | 0 | 1 | 1 | 1 |
| 3 | 0 | 0 | 1 | 0 | 1 | 1 | 0 | 0 | 1 | 0 | 1 |
| 4 | 1 | 0 | 1 | 1 | 1 | 1 | 1 | 0 | 1 | 1 | 1 |
| 5 | 1 | 1 | 1 | 1 | 0 | 1 | 1 | 1 | 1 | 1 | 0 |
| 6 | 1 | 0 | 1 | 1 | 1 | 1 | 1 | 0 | 1 | 1 | 1 |
| 7 | 1 | 1 | 1 | 0 | 1 | 1 | 1 | 1 | 1 | 0 | 1 |
| 8 | 1 | 0 | 1 | 0 | 0 | 1 | 1 | 0 | 1 | 0 | 0 |
| 9 | 0 | 0 | 1 | 0 | 1 | 1 | 0 | 0 | 1 | 0 | 1 |
| 10 | 0 | 1 | 1 | 0 | 0 | 1 | 0 | 1 | 1 | 0 | 0 |
| 11 | 1 | 1 | 1 | 1 | 0 | 1 | 1 | 1 | 1 | 1 | 0 |
| 12 | 0 | 1 | 1 | 0 | 0 | 1 | 0 | 1 | 1 | 0 | 0 |
| 13 | 0 | 0 | 1 | 0 | 1 | 1 | 0 | 0 | 1 | 0 | 1 |
| 14 | 0 | 1 | 1 | 0 | 0 | 1 | 0 | 1 | 1 | 0 | 0 |
| 15 | 0 | 0 | 1 | 1 | 0 | 1 | 0 | 0 | 1 | 1 | 0 |
| 16 | 0 | 1 | 1 | 1 | 1 | 1 | 0 | 1 | 1 | 1 | 1 |

FIG. 14B

| Bit # | N _{pilot} = 7 | | | | | | | N _{pilot} = 8 | | | | | | | |
|---------|------------------------|---|---|---|---|---|---|------------------------|---|---|---|---|---|---|---|
| | 0 | 1 | 2 | 3 | 4 | 5 | 6 | 0 | 1 | 2 | 3 | 4 | 5 | 6 | 7 |
| Slot #1 | 1 | 1 | 1 | 1 | 1 | 0 | 0 | 1 | 1 | 1 | 1 | 1 | 1 | 1 | 0 |
| 2 | 1 | 1 | 0 | 1 | 1 | 1 | 1 | 1 | 1 | 1 | 0 | 1 | 1 | 1 | 1 |
| 3 | 1 | 0 | 0 | 1 | 0 | 1 | 1 | 1 | 0 | 1 | 0 | 1 | 0 | 1 | 1 |
| 4 | 1 | 1 | 0 | 1 | 1 | 1 | 1 | 1 | 1 | 1 | 0 | 1 | 1 | 1 | 1 |
| 5 | 1 | 1 | 1 | 1 | 1 | 0 | 1 | 1 | 1 | 1 | 1 | 1 | 1 | 1 | 0 |
| 6 | 1 | 1 | 0 | 1 | 1 | 1 | 1 | 1 | 1 | 1 | 0 | 1 | 1 | 1 | 1 |
| 7 | 1 | 1 | 1 | 1 | 0 | 1 | 1 | 1 | 1 | 1 | 1 | 1 | 0 | 1 | 1 |
| 8 | 1 | 1 | 0 | 1 | 0 | 0 | 1 | 1 | 1 | 1 | 0 | 1 | 0 | 1 | 0 |
| 9 | 1 | 0 | 0 | 1 | 0 | 1 | 1 | 1 | 0 | 1 | 0 | 1 | 0 | 1 | 1 |
| 10 | 1 | 0 | 1 | 1 | 0 | 0 | 1 | 1 | 0 | 1 | 1 | 1 | 0 | 1 | 0 |
| 11 | 1 | 1 | 1 | 1 | 1 | 0 | 1 | 1 | 1 | 1 | 1 | 1 | 1 | 1 | 0 |
| 12 | 1 | 0 | 1 | 1 | 0 | 0 | 1 | 1 | 0 | 1 | 1 | 1 | 0 | 1 | 0 |
| 13 | 1 | 0 | 0 | 1 | 0 | 1 | 1 | 1 | 0 | 1 | 0 | 1 | 0 | 1 | 1 |
| 14 | 1 | 0 | 1 | 1 | 0 | 0 | 1 | 1 | 0 | 1 | 1 | 1 | 0 | 1 | 0 |
| 15 | 1 | 0 | 0 | 1 | 1 | 0 | 1 | 1 | 0 | 1 | 0 | 1 | 1 | 1 | 0 |
| 16 | 1 | 0 | 1 | 1 | 1 | 1 | 1 | 1 | 0 | 1 | 1 | 1 | 1 | 1 | 1 |

FIG. 14C

| Npilot | Pilot bit position # | Corresponding word of lenght 16 |
|--------|----------------------|---------------------------------|
| 5 | 0 | C ₁ |
| | 1 | C ₂ |
| | 3 | C ₃ |
| | 4 | C ₄ |
| 6 | 1 | C ₁ |
| | 2 | C ₂ |
| | 4 | C ₃ |
| | 5 | C ₄ |
| 7 | 1 | C ₁ |
| | 2 | C ₂ |
| | 4 | C ₃ |
| | 5 | C ₄ |
| 8 | 1 | C ₁ |
| | 3 | C ₂ |
| | 5 | C ₃ |
| | 7 | C ₄ |

FIG. 14D

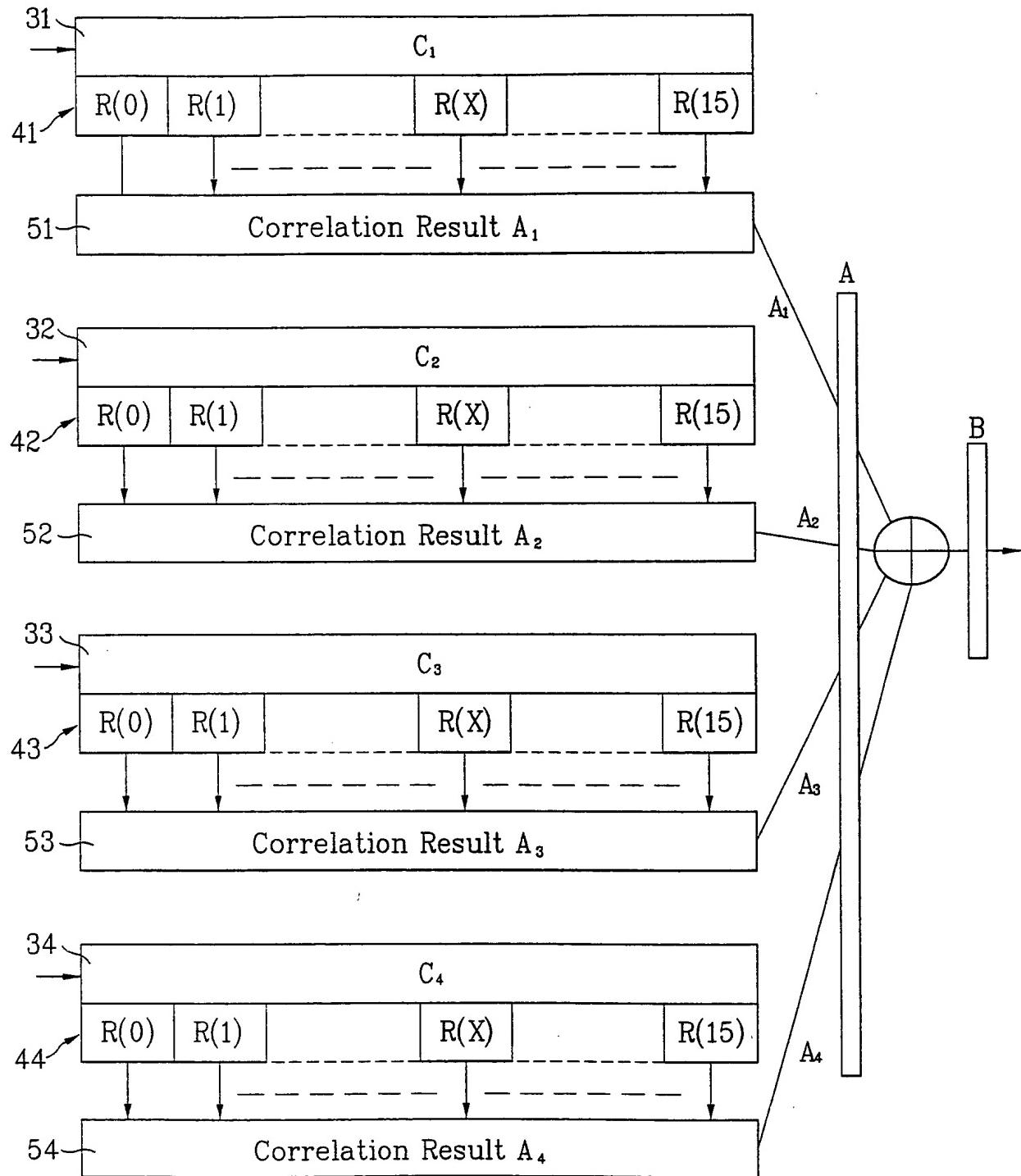


FIG. 14E

| | $R_x(0)$ | $R_x(1)$ | $R_x(2)$ | $R_x(3)$ | $R_x(4)$ | $R_x(5)$ | $R_x(6)$ | $R_x(7)$ | $R_x(8)$ | $R_x(9)$ | $R_x(10)$ | $R_x(11)$ | $R_x(12)$ | $R_x(13)$ | $R_x(14)$ | $R_x(15)$ |
|-------------------------|----------|----------|----------|----------|----------|----------|----------|----------|----------|----------|-----------|-----------|-----------|-----------|-----------|-----------|
| A ₁ POINT | 16 | 4 | 0 | 4 | 0 | -4 | 0 | -4 | -16 | -4 | 0 | -4 | 0 | 4 | 0 | 4 |
| A ₂ POINT | 16 | -4 | 0 | -4 | 0 | 4 | 0 | 4 | -16 | 4 | 0 | 4 | 0 | -4 | 0 | -4 |
| A ₃ POINT | 16 | 4 | 0 | 4 | 0 | -4 | 0 | -4 | -16 | -4 | 0 | -4 | 0 | 4 | 0 | 4 |
| A ₄ POINT | 16 | -4 | 0 | -4 | 0 | 4 | 0 | 4 | -16 | 4 | 0 | 4 | 0 | -4 | 0 | -4 |
| B POINT | 64 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | -64 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |

FIG. 14F

| | $R_x(0)$ | $R_x(1)$ | $R_x(2)$ | $R_x(3)$ | $R_x(4)$ | $R_x(5)$ | $R_x(6)$ | $R_x(7)$ | $R_x(8)$ | $R_x(9)$ | $R_x(10)$ | $R_x(11)$ | $R_x(12)$ | $R_x(13)$ | $R_x(14)$ | $R_x(15)$ |
|--|----------|----------|----------|----------|----------|----------|----------|----------|----------|----------|-----------|-----------|-----------|-----------|-----------|-----------|
| A ₁ POINT + A ₂ POINT | 32 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | -32 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| A ₃ POINT + A ₄ POINT | 32 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | -32 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| A ₁ POINT + A ₄ POINT | 32 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | -32 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| A ₂ POINT + A ₃ POINT | 32 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | -32 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |

FIG. 14G

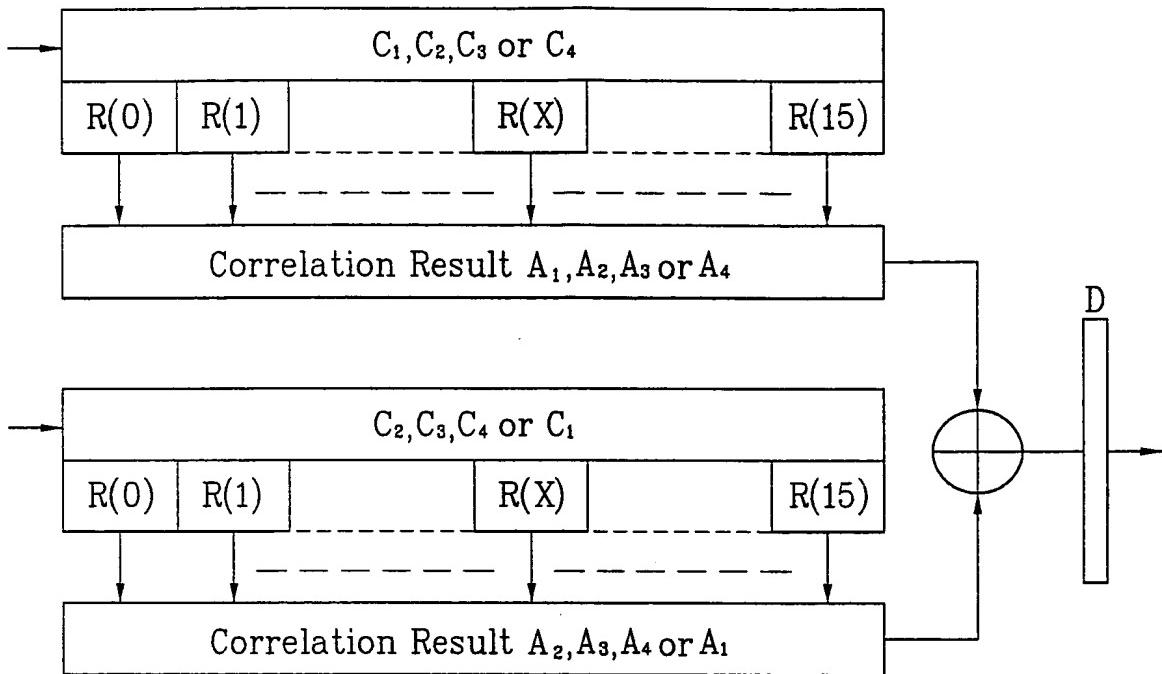


FIG. 14H

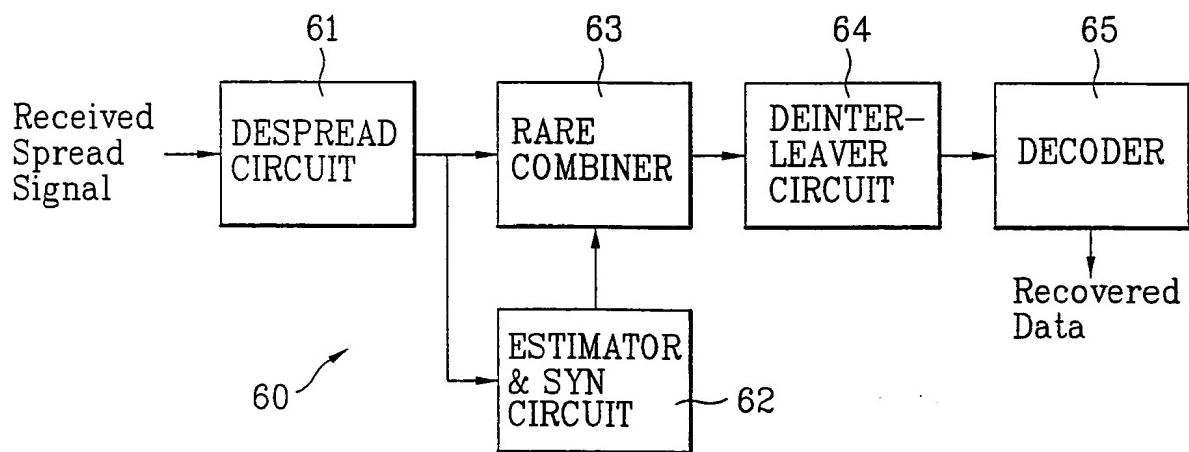


FIG. 14I

| | $R_x(0)$ | $R_x(1)$ | $R_x(2)$ | $R_x(3)$ | $R_x(4)$ | $R_x(5)$ | $R_x(6)$ | $R_x(7)$ | $R_x(8)$ | $R_x(9)$ | $R_x(10)$ | $R_x(11)$ | $R_x(12)$ | $R_x(13)$ | $R_x(14)$ | $R_x(15)$ |
|-------------------------|----------|----------|----------|----------|----------|----------|----------|----------|----------|----------|-----------|-----------|-----------|-----------|-----------|-----------|
| A ₁ POINT | 16 | -4 | -4 | 8 | 0 | -4 | 0 | 0 | -4 | 0 | 0 | -4 | 0 | 8 | -4 | -4 |
| A ₂ POINT | 16 | 0 | 0 | -4 | -4 | -4 | 0 | 0 | 12 | 0 | 0 | -4 | -4 | -4 | 0 | 0 |
| A ₃ POINT | 16 | 4 | 0 | 0 | 4 | 8 | 8 | 0 | 0 | 0 | 8 | 8 | 4 | 0 | 0 | 4 |
| A ₄ POINT | 16 | 0 | 4 | -4 | 0 | 0 | -4 | 4 | 0 | 4 | -4 | 0 | 0 | -4 | 4 | 0 |
| B POINT | 64 | 0 | 0 | 0 | 0 | 0 | 4 | 4 | 8 | 4 | 4 | 0 | 0 | 0 | 0 | 0 |

FIG. 14J

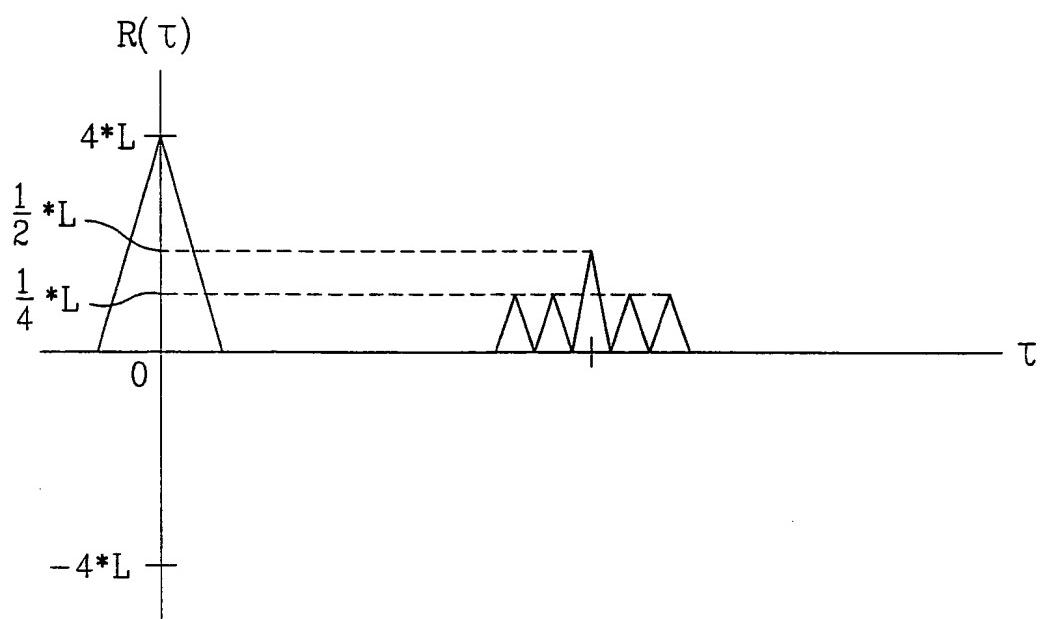


FIG. 15A

| | N _{pilot} = 4 | | N _{pilot} = 8 | | | | N _{pilot} = 16 | | | | | | | |
|----------|------------------------|----|------------------------|----|----|----|-------------------------|----|----|----|----|----|----|----|
| Symbol # | 0 | 1 | 0 | 1 | 2 | 3 | 0 | 1 | 2 | 3 | 4 | 5 | 6 | 7 |
| Slot #1 | 11 | 11 | 11 | 11 | 11 | 10 | 11 | 11 | 11 | 10 | 11 | 11 | 11 | 01 |
| 2 | 11 | 10 | 11 | 10 | 11 | 11 | 11 | 10 | 11 | 11 | 11 | 01 | 11 | 11 |
| 3 | 11 | 00 | 11 | 00 | 11 | 01 | 11 | 00 | 11 | 01 | 11 | 11 | 11 | 01 |
| 4 | 11 | 10 | 11 | 10 | 11 | 11 | 11 | 10 | 11 | 11 | 11 | 10 | 11 | 00 |
| 5 | 11 | 11 | 11 | 11 | 11 | 10 | 11 | 11 | 11 | 10 | 11 | 00 | 11 | 01 |
| 6 | 11 | 10 | 11 | 10 | 11 | 11 | 11 | 10 | 11 | 11 | 11 | 01 | 11 | 00 |
| 7 | 11 | 11 | 11 | 11 | 11 | 01 | 11 | 11 | 11 | 01 | 11 | 00 | 11 | 10 |
| 8 | 11 | 10 | 11 | 10 | 11 | 00 | 11 | 10 | 11 | 00 | 11 | 01 | 11 | 11 |
| 9 | 11 | 00 | 11 | 00 | 11 | 01 | 11 | 00 | 11 | 01 | 11 | 00 | 11 | 10 |
| 10 | 11 | 01 | 11 | 01 | 11 | 00 | 11 | 01 | 11 | 00 | 11 | 10 | 11 | 00 |
| 11 | 11 | 11 | 11 | 11 | 11 | 10 | 11 | 11 | 11 | 10 | 11 | 00 | 11 | 10 |
| 12 | 11 | 01 | 11 | 01 | 11 | 00 | 11 | 01 | 11 | 00 | 11 | 01 | 11 | 11 |
| 13 | 11 | 00 | 11 | 00 | 11 | 01 | 11 | 00 | 11 | 01 | 11 | 11 | 11 | 10 |
| 14 | 11 | 01 | 11 | 01 | 11 | 00 | 11 | 01 | 11 | 00 | 11 | 10 | 11 | 11 |
| 15 | 11 | 00 | 11 | 00 | 11 | 10 | 11 | 00 | 11 | 10 | 11 | 11 | 11 | 01 |
| 16 | 11 | 01 | 11 | 01 | 11 | 11 | 11 | 01 | 11 | 11 | 11 | 10 | 11 | 00 |

FIG. 15B

| Symbol rate | Symbol # | Channel | Corresponding word of length L=16 |
|------------------------|----------|---------|-----------------------------------|
| N _{pilot} =4 | 1 | I-CH | C ₁ |
| | | Q-CH | C ₂ |
| N _{pilot} =8 | 1 | I-CH | C ₁ |
| | | Q-CH | C ₂ |
| N _{pilot} =16 | 3 | I-CH | C ₃ |
| | | Q-CH | C ₄ |
| N _{pilot} =16 | 1 | I-CH | C ₁ |
| | | Q-CH | C ₂ |
| N _{pilot} =16 | 3 | I-CH | C ₃ |
| | | Q-CH | C ₄ |
| N _{pilot} =16 | 5 | I-CH | C ₅ |
| | | Q-CH | C ₆ |
| N _{pilot} =16 | 7 | I-CH | C ₇ |
| | | Q-CH | C ₈ |

FIG. 15C

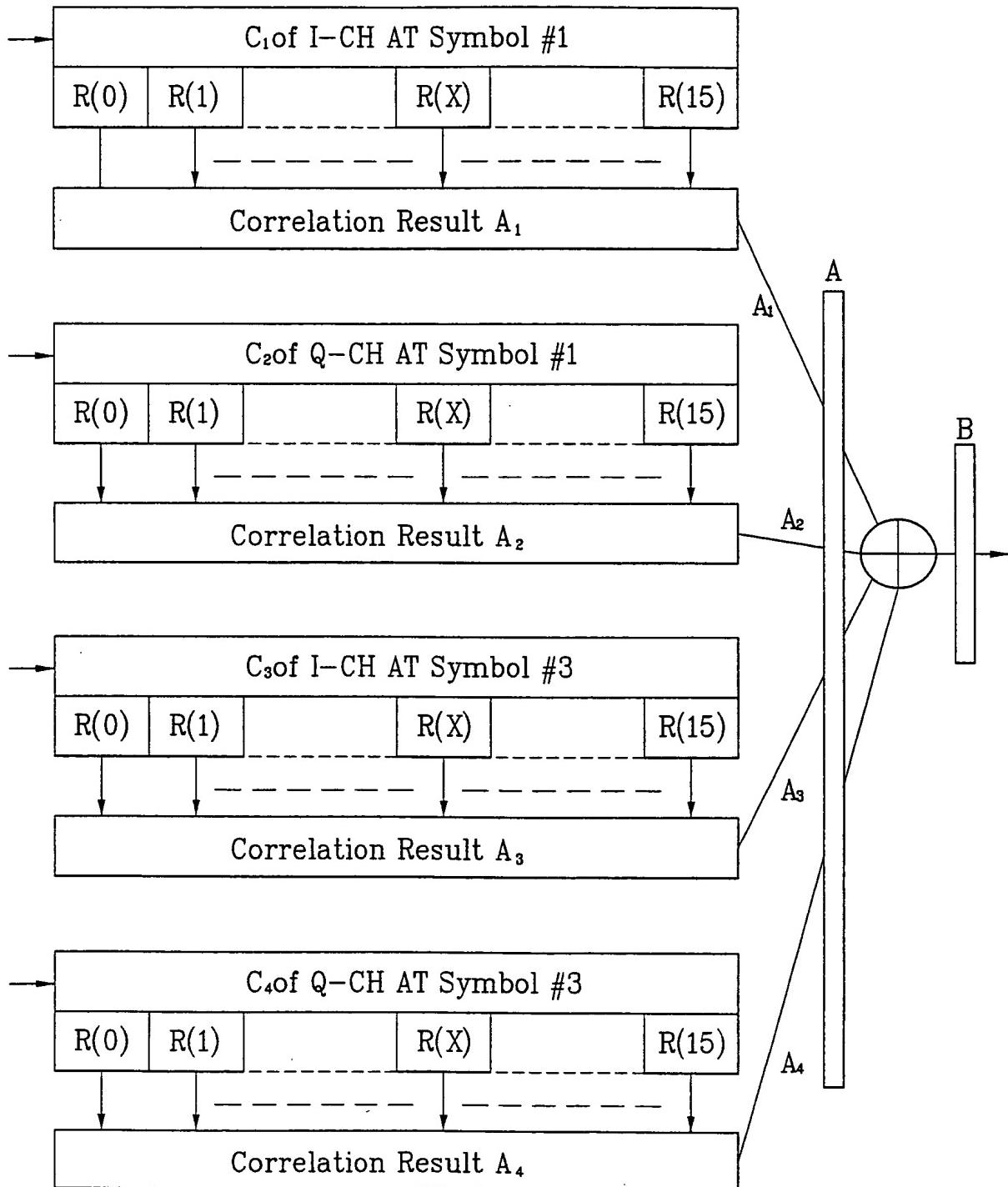


FIG. 16A

| Symbol # | 0 | 1 | 2 | 3 |
|----------|----|----|----|----|
| Slot #1 | 11 | 11 | 11 | 10 |
| 2 | 11 | 10 | 11 | 11 |
| 3 | 11 | 00 | 11 | 01 |
| 4 | 11 | 10 | 11 | 11 |
| 5 | 11 | 11 | 11 | 10 |
| 6 | 11 | 10 | 11 | 11 |
| 7 | 11 | 11 | 11 | 01 |
| 8 | 11 | 10 | 11 | 00 |
| 9 | 11 | 00 | 11 | 01 |
| 10 | 11 | 01 | 11 | 00 |
| 11 | 11 | 11 | 11 | 10 |
| 12 | 11 | 01 | 11 | 00 |
| 13 | 11 | 00 | 11 | 01 |
| 14 | 11 | 01 | 11 | 00 |
| 15 | 11 | 00 | 11 | 10 |
| 16 | 11 | 01 | 11 | 11 |

FIG. 16B

| Symbol # | Channel | Corresponding word of length 16 |
|----------|---------|------------------------------------|
| 1 | I-CH | C ₁ |
| | Q-CH | C ₂ |
| 3 | I-CH | C ₃ |
| | Q-CH | C ₄ |

FIG. 16C

| Symbol rate | $N_{\text{pilot}} = 8$ | | | | $N_{\text{pilot}} = 1$ | | | | | | | |
|-------------|------------------------|----|----|----|------------------------|----|----|----|----|----|----|----|
| Symbol # | 0 | 1 | 2 | 3 | 0 | 1 | 2 | 3 | 4 | 5 | 6 | 7 |
| Slot #1 | 11 | 11 | 11 | 10 | 11 | 11 | 11 | 10 | 11 | 11 | 11 | 01 |
| 2 | 11 | 10 | 11 | 11 | 11 | 10 | 11 | 11 | 11 | 01 | 11 | 11 |
| 3 | 11 | 00 | 11 | 01 | 11 | 00 | 11 | 01 | 11 | 11 | 11 | 01 |
| 4 | 11 | 10 | 11 | 11 | 11 | 10 | 11 | 11 | 11 | 10 | 11 | 00 |
| 5 | 11 | 11 | 11 | 10 | 11 | 11 | 11 | 10 | 11 | 00 | 11 | 01 |
| 6 | 11 | 10 | 11 | 11 | 11 | 10 | 11 | 11 | 11 | 01 | 11 | 00 |
| 7 | 11 | 11 | 11 | 01 | 11 | 11 | 11 | 01 | 11 | 00 | 11 | 10 |
| 8 | 11 | 10 | 11 | 00 | 11 | 10 | 11 | 00 | 11 | 01 | 11 | 11 |
| 9 | 11 | 00 | 11 | 01 | 11 | 00 | 11 | 01 | 11 | 00 | 11 | 10 |
| 10 | 11 | 01 | 11 | 00 | 11 | 01 | 11 | 00 | 11 | 10 | 11 | 00 |
| 11 | 11 | 11 | 11 | 10 | 11 | 11 | 11 | 10 | 11 | 00 | 11 | 10 |
| 12 | 11 | 01 | 11 | 00 | 11 | 01 | 11 | 00 | 11 | 01 | 11 | 11 |
| 13 | 11 | 00 | 11 | 01 | 11 | 00 | 11 | 01 | 11 | 11 | 11 | 10 |
| 14 | 11 | 01 | 11 | 00 | 11 | 01 | 11 | 00 | 11 | 10 | 11 | 11 |
| 15 | 11 | 00 | 11 | 10 | 11 | 00 | 11 | 10 | 11 | 11 | 11 | 01 |
| 16 | 11 | 01 | 11 | 11 | 11 | 01 | 11 | 11 | 11 | 10 | 11 | 00 |

FIG. 16D

| Symbol rate | Symbol # | Channel | Corresponding word of length L=16 |
|-------------------------|----------|---------|-----------------------------------|
| $N_{\text{pilot}} = 8$ | 1 | I-CH | C ₁ |
| | | Q-CH | C ₂ |
| | 3 | I-CH | C ₃ |
| | | Q-CH | C ₄ |
| $N_{\text{pilot}} = 16$ | 1 | I-CH | C ₁ |
| | | Q-CH | C ₂ |
| | 3 | I-CH | C ₃ |
| | | Q-CH | C ₄ |
| | 5 | I-CH | C ₅ |
| | | Q-CH | C ₆ |
| | 7 | I-CH | C ₇ |
| | | Q-CH | C ₈ |

FIG. 17A

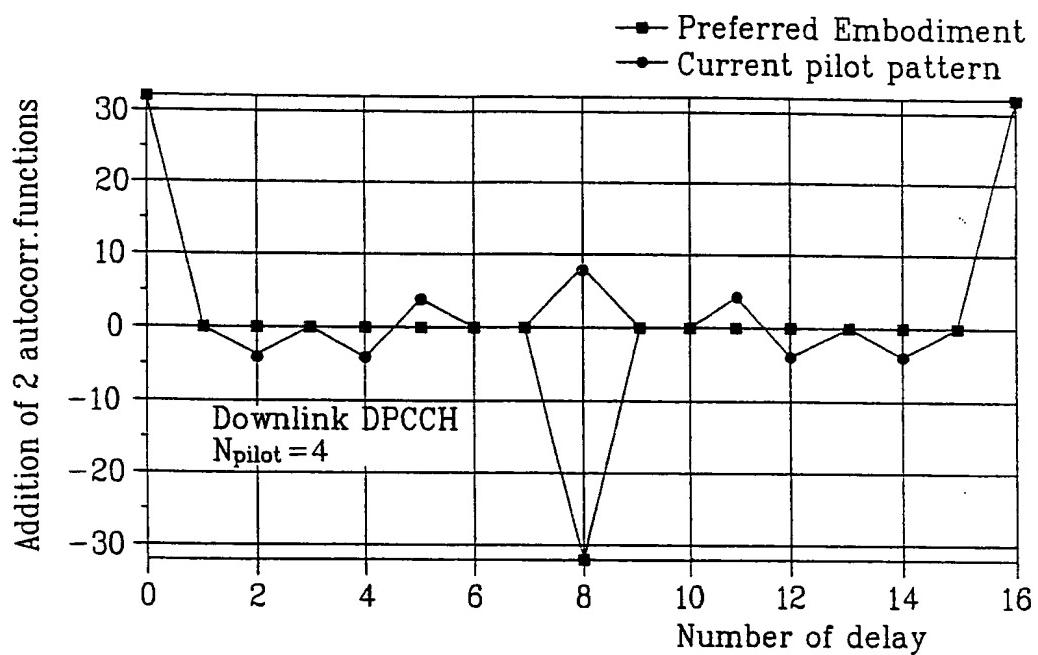


FIG. 17B

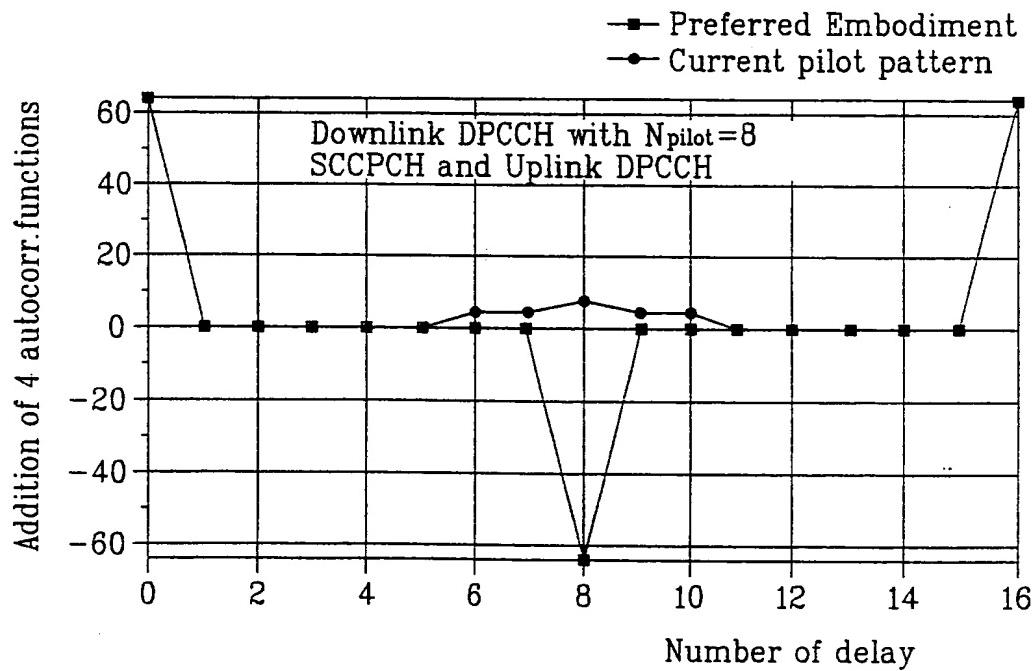


FIG. 17C

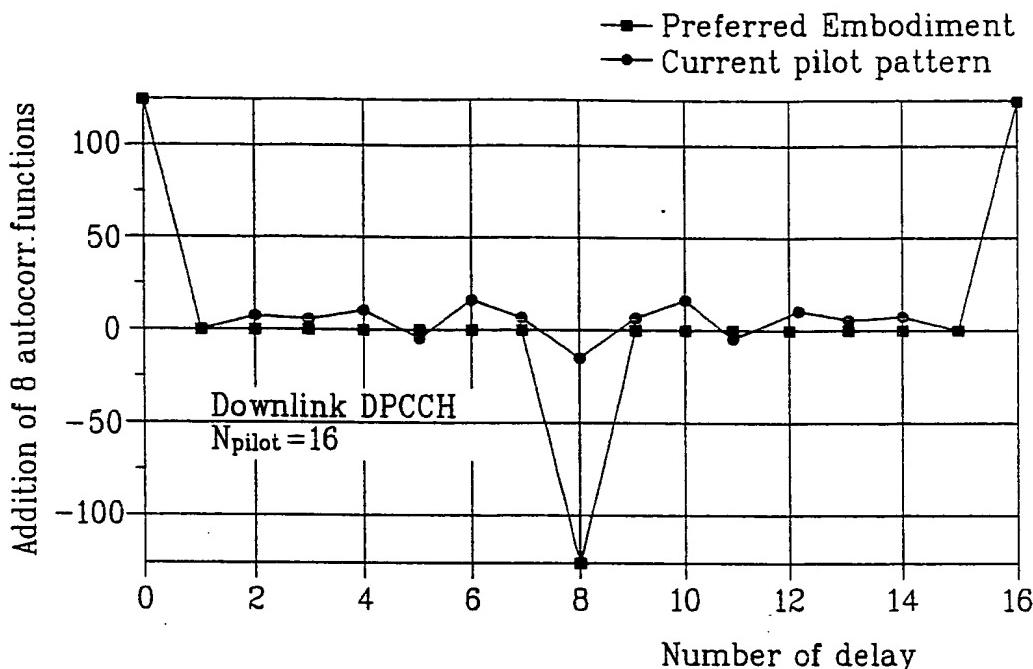


FIG. 18A

| Parameters | Downlink |
|---|------------------------------------|
| Slot per frame | 16 |
| Number of bits in the DPCCH (Pilot/TPC/TFCI) | 4/2/0 |
| Number of bits in the DPDCH per each slot | 4 |
| Spreding factor (DPDCH) | 512 |
| Spreding factor (DPCCH) | 512 |
| Modulation | QPSK |
| 3dB bandwidth | 4.096MHz |
| Shaping filter | Root raised cosine (roll off 0.22) |
| Power amplifier | Ideal |
| Propogation channel | AWGN |

FIG. 18B

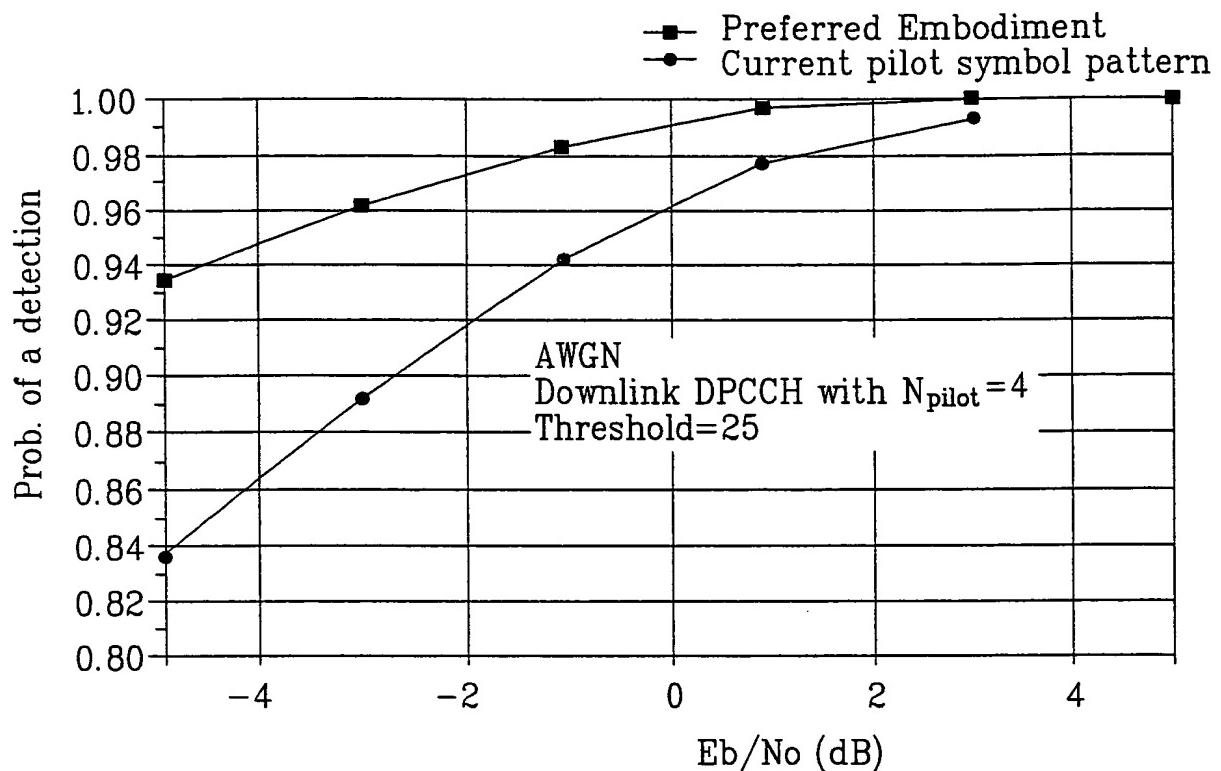


FIG. 18C

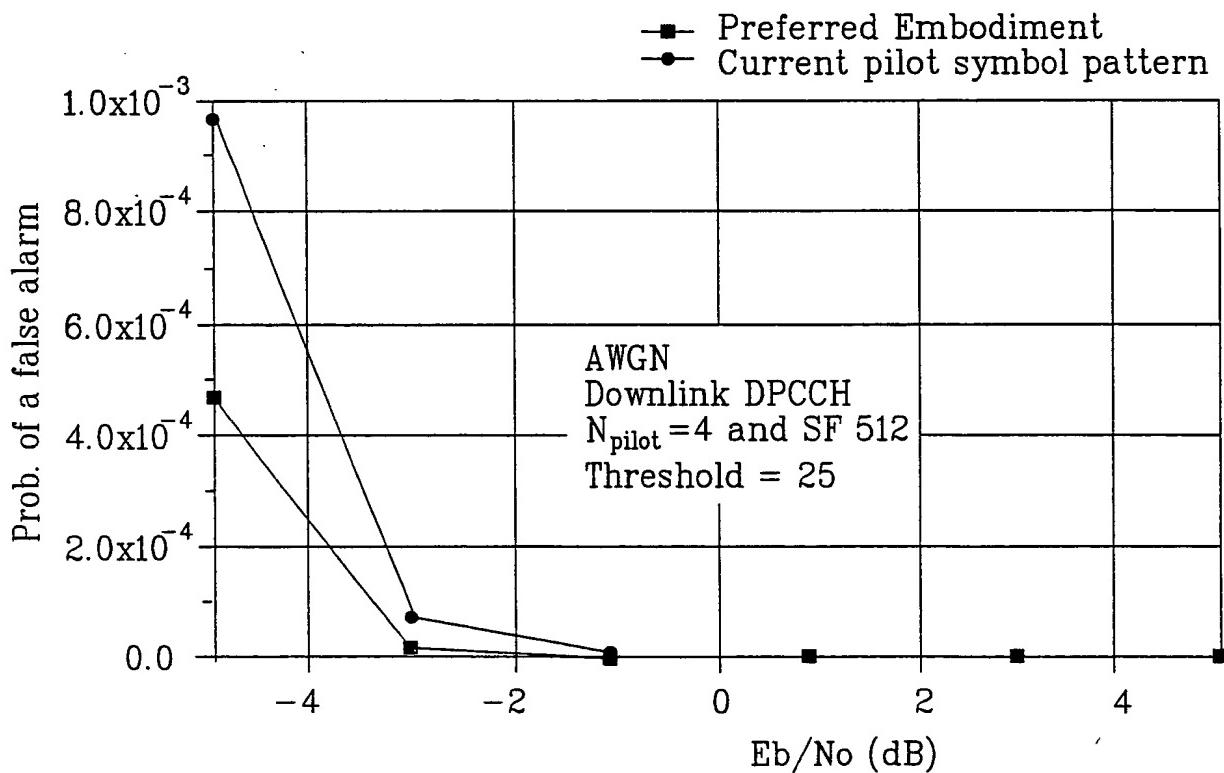


FIG. 18D

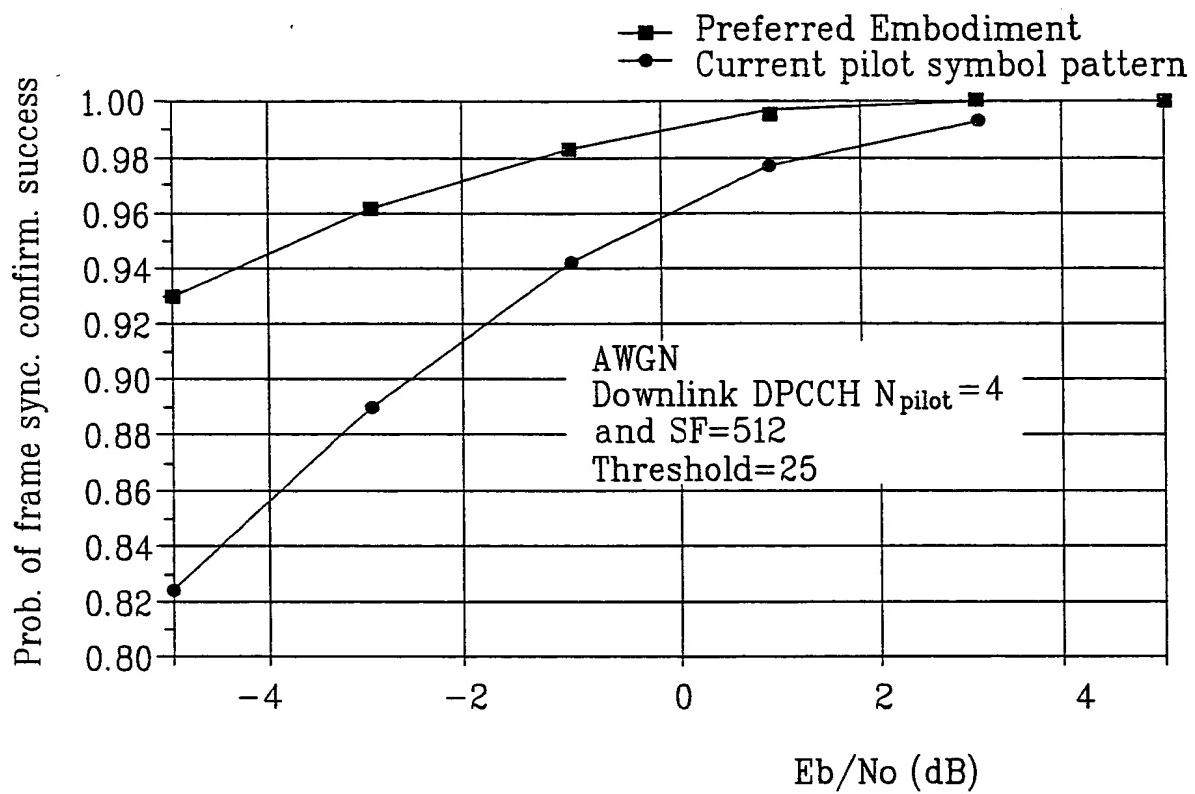


FIG. 19A

| Symbol # | Npilot = 4 | | Npilot = 8 | | | | Npilot = 16 | | | | | | | |
|----------|------------|----|------------|----|----|----|-------------|----|----|----|----|----|----|----|
| | 0 | 1 | 0 | 1 | 2 | 3 | 0 | 1 | 2 | 3 | 4 | 5 | 6 | 7 |
| Slot #1 | 01 | 10 | 11 | 00 | 00 | 10 | 11 | 00 | 00 | 10 | 11 | 11 | 00 | 10 |
| | 00 | 10 | 11 | 01 | 00 | 11 | 11 | 01 | 00 | 11 | 11 | 01 | 00 | 00 |
| | 10 | 10 | 11 | 11 | 00 | 01 | 11 | 11 | 00 | 01 | 11 | 11 | 00 | 10 |
| | 00 | 10 | 11 | 01 | 00 | 11 | 11 | 01 | 00 | 11 | 11 | 10 | 00 | 11 |
| | 01 | 10 | 11 | 00 | 00 | 10 | 11 | 00 | 00 | 10 | 11 | 11 | 00 | 01 |
| | 00 | 10 | 11 | 01 | 00 | 11 | 11 | 01 | 00 | 11 | 11 | 10 | 00 | 00 |
| | 01 | 10 | 11 | 11 | 00 | 10 | 11 | 11 | 00 | 10 | 11 | 00 | 00 | 01 |
| | 00 | 10 | 11 | 10 | 00 | 11 | 11 | 10 | 00 | 11 | 11 | 01 | 00 | 00 |
| | 10 | 10 | 11 | 11 | 00 | 01 | 11 | 11 | 00 | 01 | 11 | 00 | 00 | 01 |
| | 11 | 10 | 11 | 10 | 00 | 00 | 11 | 10 | 00 | 00 | 11 | 10 | 00 | 11 |
| | 01 | 10 | 11 | 00 | 00 | 10 | 11 | 00 | 00 | 10 | 11 | 00 | 00 | 01 |
| | 11 | 10 | 11 | 10 | 00 | 00 | 11 | 10 | 00 | 00 | 11 | 01 | 00 | 00 |
| | 10 | 10 | 11 | 11 | 00 | 01 | 11 | 11 | 00 | 01 | 11 | 00 | 00 | 10 |
| | 11 | 10 | 11 | 10 | 00 | 00 | 11 | 10 | 00 | 00 | 11 | 01 | 00 | 11 |
| | 10 | 10 | 11 | 00 | 00 | 01 | 11 | 00 | 00 | 01 | 11 | 11 | 00 | 10 |
| | 11 | 10 | 11 | 01 | 00 | 00 | 11 | 01 | 00 | 00 | 11 | 10 | 00 | 11 |

FIG. 19B

| Symbol rate | Symbol # | Channel | Corresponding word of length 16 |
|-------------|----------|---------|---------------------------------|
| Npilot = 4 | 0 | I - CH | -C ₁ |
| | | Q - CH | C ₂ |
| Npilot = 8 | 1 | I - CH | -C ₃ |
| | | Q - CH | C ₄ |
| Npilot = 16 | 3 | I - CH | C ₁ |
| | | Q - CH | -C ₂ |
| Npilot = 16 | 1 | I - CH | -C ₃ |
| | | Q - CH | C ₄ |
| Npilot = 16 | 3 | I - CH | C ₁ |
| | | Q - CH | -C ₂ |
| Npilot = 16 | 5 | I - CH | -C ₇ |
| | | Q - CH | C ₈ |
| Npilot = 16 | 7 | I - CH | C ₆ |
| | | Q - CH | -C ₆ |

FIG. 19C

| Symbol # | 0 | 1 | 2 | 3 |
|----------|----|----|----|----|
| Slot #1 | 11 | 11 | 00 | 01 |
| 2 | 11 | 10 | 00 | 00 |
| 3 | 11 | 00 | 00 | 10 |
| 4 | 11 | 10 | 00 | 00 |
| 5 | 11 | 11 | 00 | 01 |
| 6 | 11 | 10 | 00 | 00 |
| 7 | 11 | 11 | 00 | 10 |
| 8 | 11 | 10 | 00 | 11 |
| 9 | 11 | 00 | 00 | 10 |
| 10 | 11 | 01 | 00 | 11 |
| 11 | 11 | 11 | 00 | 01 |
| 12 | 11 | 01 | 00 | 11 |
| 13 | 11 | 00 | 00 | 10 |
| 14 | 11 | 01 | 00 | 11 |
| 15 | 11 | 00 | 00 | 01 |
| 16 | 11 | 01 | 00 | 00 |

FIG. 19D

| Symbol rate | Channel | Corresponding word of length 16 |
|-------------|---------|------------------------------------|
| 1 | I - CH | C_1 |
| | Q - CH | C_2 |
| 3 | I - CH | $-C_3$ |
| | Q - CH | $-C_4$ |

FIG. 19E

| Symbol # | Npilot = 8 | | | | Npilot = 16 | | | | | | | |
|----------|------------|----|----|----|-------------|----|----|----|----|----|----|----|
| | 0 | 1 | 2 | 3 | 0 | 1 | 2 | 3 | 4 | 5 | 6 | 7 |
| Slot #1 | 11 | 00 | 00 | 10 | 11 | 00 | 00 | 10 | 11 | 11 | 00 | 10 |
| | 11 | 01 | 00 | 11 | 11 | 01 | 00 | 11 | 11 | 01 | 00 | 00 |
| | 11 | 11 | 00 | 01 | 11 | 11 | 00 | 01 | 11 | 11 | 00 | 10 |
| | 11 | 01 | 00 | 11 | 11 | 01 | 00 | 11 | 11 | 10 | 00 | 11 |
| | 11 | 00 | 00 | 10 | 11 | 00 | 00 | 10 | 11 | 11 | 00 | 01 |
| | 11 | 01 | 00 | 11 | 11 | 01 | 00 | 11 | 11 | 10 | 00 | 00 |
| | 11 | 11 | 00 | 10 | 11 | 11 | 00 | 10 | 11 | 00 | 00 | 01 |
| | 11 | 10 | 00 | 11 | 11 | 10 | 00 | 11 | 11 | 01 | 00 | 00 |
| | 11 | 11 | 00 | 01 | 11 | 11 | 00 | 01 | 11 | 00 | 00 | 01 |
| | 11 | 10 | 00 | 00 | 11 | 10 | 00 | 00 | 11 | 10 | 00 | 11 |
| | 11 | 00 | 00 | 10 | 11 | 00 | 00 | 10 | 11 | 00 | 00 | 01 |
| | 11 | 10 | 00 | 00 | 11 | 10 | 00 | 00 | 11 | 01 | 00 | 00 |
| | 11 | 11 | 00 | 01 | 11 | 11 | 00 | 01 | 11 | 00 | 00 | 10 |
| | 11 | 10 | 00 | 00 | 11 | 10 | 00 | 00 | 11 | 01 | 00 | 11 |
| | 11 | 00 | 00 | 01 | 11 | 00 | 00 | 01 | 11 | 11 | 00 | 10 |
| | 11 | 01 | 00 | 00 | 11 | 01 | 00 | 00 | 11 | 10 | 00 | 11 |

FIG. 19F

| Symbol rate | Symbol # | Channel | Corresponding word of length 16 |
|-------------|----------|---------|---------------------------------|
| Npilot = 8 | 1 | I - CH | -C ₃ |
| | | Q - CH | C ₄ |
| | 3 | I - CH | C ₁ |
| | | Q - CH | -C ₂ |
| | 1 | I - CH | -C ₃ |
| | | Q - CH | C ₄ |
| | 3 | I - CH | C ₁ |
| | | Q - CH | -C ₂ |
| Npilot = 16 | 5 | I - CH | -C ₇ |
| | | Q - CH | C ₈ |
| | 7 | I - CH | C ₅ |
| | | Q - CH | -C ₆ |

FIG. 20A

| Sequence | Autocorrelation |
|---|--|
| $C_1 = (1\ 1\ 0\ 1\ 1\ 1\ 1\ 0\ 0\ 1\ 0\ 0\ 0\ 0\ 0)$ | 16 4 0 4 0 -4 0 -4 -16 -4 0 -4 0 4 0 4 |
| $C_2 = (1\ 0\ 0\ 0\ 1\ 0\ 1\ 0\ 0\ 1\ 1\ 0\ 1\ 0\ 1)$ | 16 -4 0 -4 0 4 0 4 -16 4 0 4 0 -4 0 -4 |
| $C_3 = (1\ 1\ 1\ 1\ 1\ 0\ 1\ 1\ 0\ 0\ 0\ 0\ 0\ 1\ 0\ 0)$ | 16 4 0 4 0 -4 0 -4 -16 -4 0 -4 0 4 0 4 |
| $C_4 = (0\ 1\ 0\ 1\ 0\ 0\ 0\ 1\ 1\ 0\ 1\ 0\ 1\ 1\ 1\ 0)$ | 16 -4 0 -4 0 4 0 4 -16 4 0 4 0 -4 0 -4 |
| $C_5 = (0\ 0\ 1\ 1\ 1\ 0\ 1\ 1\ 1\ 1\ 0\ 0\ 0\ 1\ 0\ 0)$ | 16 4 0 -4 0 4 0 -4 -16 -4 0 4 0 -4 0 4 |
| $C_6 = (0\ 0\ 1\ 0\ 0\ 1\ 0\ 1\ 1\ 1\ 0\ 1\ 1\ 0\ 1\ 0)$ | 16 -4 0 4 0 -4 0 4 -16 4 0 -4 0 4 0 -4 |
| $C_7 = (0\ 1\ 1\ 1\ 0\ 0\ 0\ 0\ 1\ 0\ 0\ 0\ 1\ 1\ 1\ 1)$ | 16 4 0 -4 0 4 0 -4 -16 -4 0 4 0 -4 0 4 |
| $C_8 = (1\ 0\ 1\ 1\ 1\ 0\ 1\ 0\ 0\ 1\ 0\ 0\ 0\ 1\ 0\ 1)$ | 16 -4 0 4 0 -4 0 4 -16 4 0 -4 0 4 0 -4 |
| $C_9 = (0\ 0\ 1\ 1\ 0\ 1\ 1\ 1\ 1\ 1\ 0\ 0\ 1\ 0\ 0\ 0)$ | 16 4 0 4 0 -4 0 -4 -16 -4 0 -4 0 4 0 4 |
| $C_{10} = (0\ 0\ 1\ 0\ 1\ 0\ 0\ 1\ 1\ 1\ 0\ 1\ 0\ 1\ 1\ 0)$ | 16 -4 0 -4 0 4 0 4 -16 4 0 4 0 -4 0 -4 |
| $C_{11} = (1\ 1\ 0\ 0\ 0\ 0\ 0\ 1\ 0\ 0\ 1\ 1\ 1\ 1\ 0)$ | 16 4 0 4 0 -4 0 -4 -16 -4 0 -4 0 4 0 4 |
| $C_{12} = (1\ 0\ 1\ 1\ 1\ 0\ 0\ 1\ 0\ 1\ 0\ 0\ 0\ 1\ 1\ 0)$ | 16 -4 0 -4 0 4 0 4 -16 4 0 4 0 -4 0 -4 |
| $C_{13} = (0\ 1\ 0\ 0\ 0\ 0\ 1\ 1\ 1\ 0\ 1\ 1\ 1\ 1\ 0\ 0)$ | 16 4 0 -4 0 4 0 -4 -16 -4 0 4 0 -4 0 4 |
| $C_{14} = (1\ 0\ 0\ 0\ 1\ 0\ 0\ 1\ 0\ 1\ 1\ 1\ 0\ 1\ 1\ 0)$ | 16 -4 0 4 0 -4 0 4 -16 4 0 -4 0 4 0 -4 |
| $C_{15} = (0\ 0\ 0\ 0\ 1\ 0\ 0\ 0\ 1\ 1\ 1\ 1\ 0\ 1\ 1\ 1)$ | 16 4 0 -4 0 4 0 -4 -16 -4 0 4 0 -4 0 4 |
| $C_{16} = (1\ 0\ 0\ 1\ 0\ 0\ 0\ 1\ 0\ 1\ 1\ 0\ 1\ 1\ 1\ 0)$ | 16 -4 0 4 0 -4 0 4 -16 4 0 -4 0 4 0 -4 |

FIG. 20B

| $R(\tau)$ | τ | 0 | 1 | 2 | 3 | 4 | 5 | 6 | 7 | 8 | 9 | 10 | 11 | 12 | 13 | 14 | 15 |
|-------------|--------|----|---|----|---|----|---|----|-----|----|---|----|----|----|----|----|----|
| $R_E(\tau)$ | 16 | 4 | 0 | 4 | 0 | -4 | 0 | -4 | -16 | -4 | 0 | -4 | 0 | 4 | 0 | 4 | |
| $R_F(\tau)$ | 16 | -4 | 0 | -4 | 0 | 4 | 0 | 4 | -16 | 4 | 0 | 4 | 0 | -4 | 0 | -4 | |
| $R_G(\tau)$ | 16 | 4 | 0 | -4 | 0 | 4 | 0 | -4 | -16 | -4 | 0 | 4 | 0 | -4 | 0 | 4 | |
| $R_H(\tau)$ | 16 | -4 | 0 | 4 | 0 | -4 | 0 | 4 | -16 | 4 | 0 | -4 | 0 | 4 | 0 | -4 | |

FIG. 20C

| Bit # | Npilot = 6 | | | | | | Npilot = 8 | | | | | | | |
|---------|------------|---|---|---|---|---|------------|---|---|---|---|---|---|---|
| | 0 | 1 | 2 | 3 | 4 | 5 | 0 | 1 | 2 | 3 | 4 | 5 | 6 | 7 |
| Slot #1 | 1 | 1 | 1 | 1 | 1 | 0 | 1 | 1 | 1 | 1 | 1 | 1 | 1 | 0 |
| 2 | 1 | 1 | 0 | 1 | 1 | 1 | 1 | 1 | 1 | 0 | 1 | 1 | 1 | 1 |
| 3 | 1 | 0 | 0 | 1 | 1 | 0 | 1 | 0 | 1 | 0 | 1 | 1 | 1 | 0 |
| 4 | 1 | 1 | 0 | 1 | 1 | 1 | 1 | 1 | 1 | 0 | 1 | 1 | 1 | 1 |
| 5 | 1 | 1 | 1 | 1 | 1 | 0 | 1 | 1 | 1 | 1 | 1 | 1 | 1 | 0 |
| 6 | 1 | 1 | 0 | 1 | 0 | 0 | 1 | 1 | 1 | 0 | 1 | 0 | 1 | 0 |
| 7 | 1 | 1 | 1 | 1 | 1 | 0 | 1 | 1 | 1 | 1 | 1 | 1 | 1 | 0 |
| 8 | 1 | 1 | 0 | 1 | 1 | 1 | 1 | 1 | 1 | 0 | 1 | 1 | 1 | 1 |
| 9 | 1 | 0 | 0 | 1 | 0 | 1 | 1 | 0 | 1 | 0 | 1 | 0 | 1 | 1 |
| 10 | 1 | 0 | 1 | 1 | 0 | 0 | 1 | 0 | 1 | 1 | 1 | 0 | 1 | 0 |
| 11 | 1 | 1 | 1 | 1 | 0 | 1 | 1 | 1 | 1 | 1 | 1 | 0 | 1 | 1 |
| 12 | 1 | 0 | 1 | 1 | 0 | 0 | 1 | 0 | 1 | 1 | 1 | 0 | 1 | 0 |
| 13 | 1 | 0 | 0 | 1 | 0 | 1 | 1 | 0 | 1 | 0 | 1 | 0 | 1 | 1 |
| 14 | 1 | 0 | 1 | 1 | 1 | 1 | 1 | 0 | 1 | 1 | 1 | 1 | 1 | 1 |
| 15 | 1 | 0 | 0 | 1 | 0 | 1 | 1 | 0 | 1 | 0 | 1 | 0 | 1 | 1 |
| 16 | 1 | 0 | 1 | 1 | 0 | 0 | 1 | 0 | 1 | 1 | 1 | 0 | 1 | 0 |

FIG. 20D

| Npilots | Pilot bit position # | Corresponding word of length 16 |
|---------|----------------------|---------------------------------|
| 6 | 1 | C ₁ |
| | 2 | C ₂ |
| | 4 | C ₃ |
| | 5 | C ₄ |
| 8 | 1 | C ₁ |
| | 3 | C ₂ |
| | 5 | C ₃ |
| | 7 | C ₄ |

FIG. 20E

| Symbol rate | 8ksps | | 16,32,64,128ksps | | | | 256,512,1024ksps | | | | | | | | |
|-------------|-------|----|------------------|----|----|----|------------------|----|----|----|----|----|----|----|----|
| Symbol # | 0 | 1 | 0 | 1 | 2 | 3 | 0 | 1 | 2 | 3 | 4 | 5 | 6 | 7 | |
| Slot #1 | 11 | 11 | 11 | 11 | 11 | 10 | 11 | 11 | 11 | 10 | 11 | 00 | 11 | 01 | |
| | 2 | 11 | 10 | 11 | 10 | 11 | 11 | 11 | 10 | 11 | 11 | 00 | 11 | 10 | |
| | 3 | 11 | 00 | 11 | 00 | 11 | 10 | 11 | 00 | 11 | 10 | 11 | 11 | 11 | |
| | 4 | 11 | 10 | 11 | 10 | 11 | 11 | 11 | 10 | 11 | 11 | 10 | 11 | 11 | |
| | 5 | 11 | 11 | 11 | 11 | 11 | 10 | 11 | 11 | 11 | 10 | 11 | 10 | 01 | |
| | 6 | 11 | 10 | 11 | 10 | 11 | 00 | 11 | 10 | 11 | 00 | 11 | 01 | 11 | 00 |
| | 7 | 11 | 11 | 11 | 11 | 11 | 10 | 11 | 11 | 10 | 11 | 10 | 11 | 01 | |
| | 8 | 11 | 10 | 11 | 10 | 11 | 11 | 11 | 10 | 11 | 11 | 11 | 11 | 00 | |
| | 9 | 11 | 00 | 11 | 00 | 11 | 01 | 11 | 00 | 11 | 01 | 11 | 11 | 10 | |
| | 10 | 11 | 01 | 11 | 01 | 11 | 00 | 11 | 01 | 11 | 00 | 11 | 11 | 01 | |
| | 11 | 11 | 11 | 11 | 11 | 01 | 11 | 11 | 11 | 01 | 11 | 11 | 00 | 11 | 00 |
| | 12 | 11 | 01 | 11 | 01 | 11 | 00 | 11 | 01 | 11 | 00 | 11 | 01 | 11 | 00 |
| | 13 | 11 | 00 | 11 | 00 | 11 | 01 | 11 | 00 | 11 | 01 | 11 | 11 | 10 | |
| | 14 | 11 | 01 | 11 | 01 | 11 | 11 | 11 | 01 | 11 | 11 | 10 | 11 | 11 | |
| | 15 | 11 | 00 | 11 | 00 | 11 | 01 | 11 | 00 | 11 | 01 | 11 | 01 | 11 | 10 |
| | 16 | 11 | 01 | 11 | 01 | 11 | 00 | 11 | 01 | 11 | 00 | 11 | 00 | 11 | 11 |

FIG. 20F

| Symbol rate | 2048,4096ksps | | | | | | | | | | | | | | | |
|-------------|---------------|----|----|----|----|----|----|----|----|----|----|----|----|----|----|----|
| Symbol # | 0 | 1 | 2 | 3 | 4 | 5 | 6 | 7 | 8 | 9 | 10 | 11 | 12 | 13 | 14 | 15 |
| Slot #1 | 11 | 11 | 11 | 10 | 11 | 00 | 11 | 01 | 11 | 00 | 11 | 11 | 11 | 01 | 11 | 01 |
| 2 | 11 | 10 | 11 | 11 | 11 | 00 | 11 | 10 | 11 | 00 | 11 | 10 | 11 | 10 | 11 | 00 |
| 3 | 11 | 00 | 11 | 10 | 11 | 11 | 11 | 11 | 11 | 11 | 11 | 01 | 11 | 00 | 11 | 00 |
| 4 | 11 | 10 | 11 | 11 | 11 | 10 | 11 | 11 | 11 | 10 | 11 | 01 | 11 | 00 | 11 | 01 |
| 5 | 11 | 11 | 11 | 10 | 11 | 10 | 11 | 01 | 11 | 01 | 11 | 01 | 11 | 01 | 11 | 10 |
| 6 | 11 | 10 | 11 | 00 | 11 | 01 | 11 | 00 | 11 | 10 | 11 | 00 | 11 | 00 | 11 | 00 |
| 7 | 11 | 11 | 11 | 10 | 11 | 10 | 11 | 01 | 11 | 10 | 11 | 00 | 11 | 10 | 11 | 00 |
| 8 | 11 | 10 | 11 | 11 | 11 | 11 | 11 | 00 | 11 | 11 | 11 | 11 | 11 | 11 | 11 | 01 |
| 9 | 11 | 00 | 11 | 01 | 11 | 11 | 11 | 10 | 11 | 11 | 11 | 00 | 11 | 10 | 11 | 10 |
| 10 | 11 | 01 | 11 | 00 | 11 | 11 | 11 | 01 | 11 | 11 | 11 | 01 | 11 | 01 | 11 | 11 |
| 11 | 11 | 11 | 11 | 01 | 11 | 00 | 11 | 00 | 11 | 00 | 11 | 10 | 11 | 11 | 11 | 11 |
| 12 | 11 | 01 | 11 | 00 | 11 | 01 | 11 | 00 | 11 | 01 | 11 | 10 | 11 | 11 | 11 | 10 |
| 13 | 11 | 00 | 11 | 01 | 11 | 01 | 11 | 10 | 11 | 10 | 11 | 10 | 11 | 10 | 11 | 01 |
| 14 | 11 | 01 | 11 | 11 | 11 | 10 | 11 | 11 | 11 | 01 | 11 | 11 | 11 | 11 | 11 | 11 |
| 15 | 11 | 00 | 11 | 01 | 11 | 01 | 11 | 10 | 11 | 01 | 11 | 11 | 11 | 01 | 11 | 11 |
| 16 | 11 | 01 | 11 | 00 | 11 | 00 | 11 | 11 | 11 | 00 | 11 | 00 | 11 | 00 | 11 | 10 |

FIG. 20G

| Symbol rate | Symbol # | Channel | Corresponding word of length 16 |
|---------------------|----------|---------|------------------------------------|
| 8ksps | 1 | I - CH | C ₁ |
| | | Q - CH | C ₂ |
| 16, 32, 64, 128ksps | 1 | I - CH | C ₁ |
| | | Q - CH | C ₂ |
| 256, 512, 1024ksps | 3 | I - CH | C ₃ |
| | | Q - CH | C ₄ |
| 2048, 4096ksps | 1 | I - CH | C ₁ |
| | | Q - CH | C ₂ |
| 2048, 4096ksps | 3 | I - CH | C ₃ |
| | | Q - CH | C ₄ |
| 2048, 4096ksps | 5 | I - CH | C ₅ |
| | | Q - CH | C ₆ |
| 2048, 4096ksps | 7 | I - CH | C ₇ |
| | | Q - CH | C ₈ |
| 2048, 4096ksps | 1 | I - CH | C ₁ |
| | | Q - CH | C ₂ |
| 2048, 4096ksps | 3 | I - CH | C ₃ |
| | | Q - CH | C ₄ |
| 2048, 4096ksps | 5 | I - CH | C ₅ |
| | | Q - CH | C ₆ |
| 2048, 4096ksps | 7 | I - CH | C ₇ |
| | | Q - CH | C ₈ |
| 2048, 4096ksps | 9 | I - CH | C ₉ |
| | | Q - CH | C ₁₀ |
| 2048, 4096ksps | 11 | I - CH | C ₁₁ |
| | | Q - CH | C ₁₂ |
| 2048, 4096ksps | 13 | I - CH | C ₁₃ |
| | | Q - CH | C ₁₄ |
| 2048, 4096ksps | 15 | I - CH | C ₁₅ |
| | | Q - CH | C ₁₆ |

FIG. 20H

| Stmbol # | 0 | 1 | 2 | 3 |
|----------|----|----|----|----|
| Slot #1 | 11 | 11 | 11 | 10 |
| 2 | 11 | 10 | 11 | 11 |
| 3 | 11 | 00 | 11 | 10 |
| 4 | 11 | 10 | 11 | 11 |
| 5 | 11 | 11 | 11 | 10 |
| 6 | 11 | 10 | 11 | 00 |
| 7 | 11 | 11 | 11 | 10 |
| 8 | 11 | 10 | 11 | 11 |
| 9 | 11 | 00 | 11 | 01 |
| 10 | 11 | 01 | 11 | 00 |
| 11 | 11 | 11 | 11 | 01 |
| 12 | 11 | 01 | 11 | 00 |
| 13 | 11 | 00 | 11 | 01 |
| 14 | 11 | 01 | 11 | 11 |
| 15 | 11 | 00 | 11 | 01 |
| 16 | 11 | 01 | 11 | 00 |

FIG. 20I

| Symbol # | Channel | Corresponding word of length 16 |
|----------|---------|------------------------------------|
| 1 | I-CH | C ₁ |
| | Q-CH | C ₂ |
| 3 | I-CH | C ₃ |
| | Q-CH | C ₄ |

FIG. 21

| Frame Synchronization Words | |
|-----------------------------|---------------------------------|
| L=15 , Slot No. | 1 2 3 4 15 |
| C ₁ = | (1 0 0 0 1 1 1 1 0 1 0 1 1 0 0) |
| C ₂ = | (1 0 1 0 0 1 1 0 1 1 1 0 0 0 0) |
| C ₃ = | (1 1 0 0 0 1 0 0 1 1 0 1 0 1 1) |
| C ₄ = | (0 0 1 0 1 0 0 0 0 1 1 1 0 1 1) |
| C ₅ = | (1 1 1 0 1 0 1 1 0 0 1 0 0 0 1) |
| C ₆ = | (1 1 0 1 1 1 0 0 0 0 1 0 1 0 0) |
| C ₇ = | (1 0 0 1 1 0 1 0 1 1 1 1 0 0 0) |
| C ₈ = | (0 0 0 0 1 1 1 0 1 1 0 0 1 0 1) |

FIG. 22A

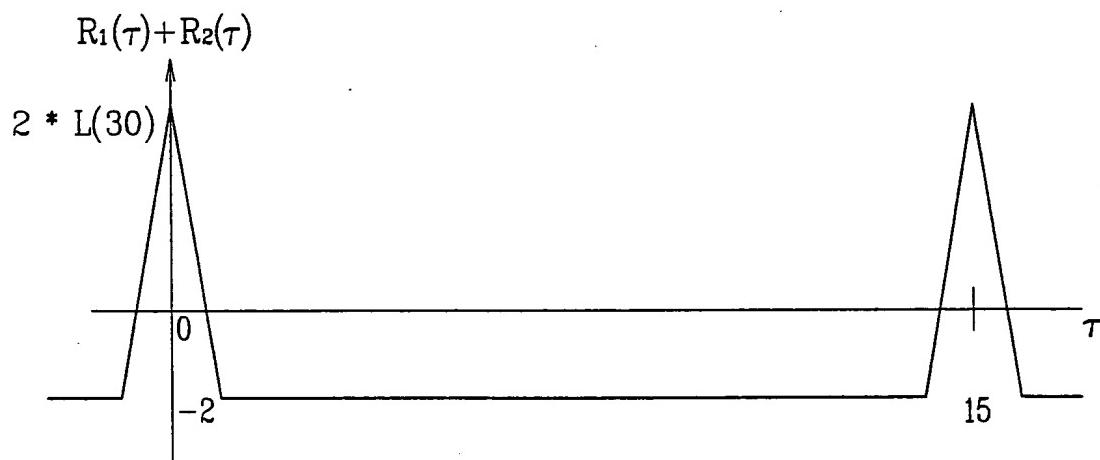


FIG. 22B

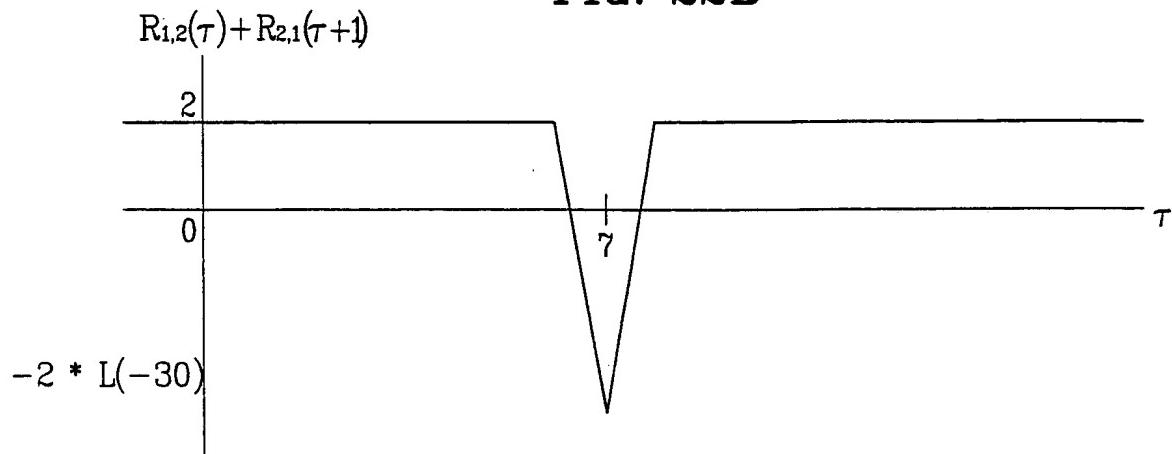


FIG. 22C

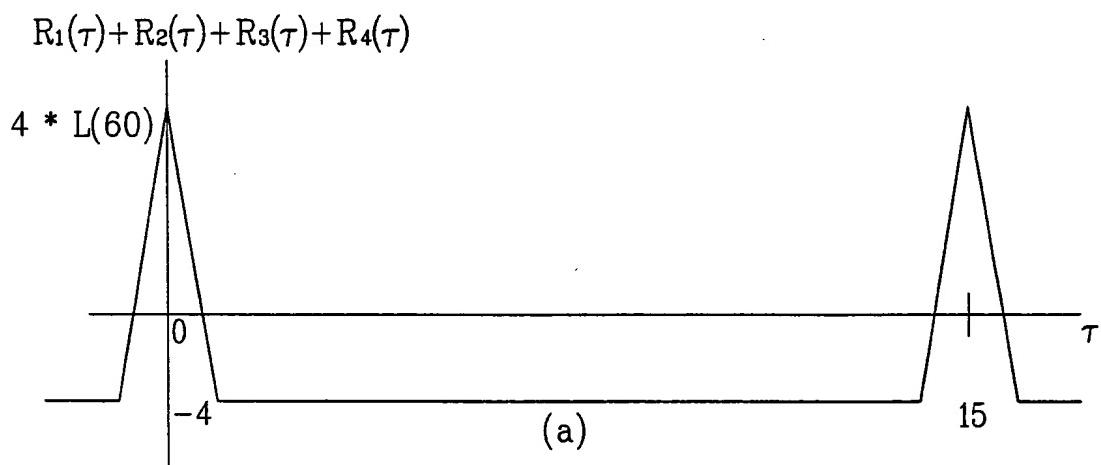


FIG. 22D

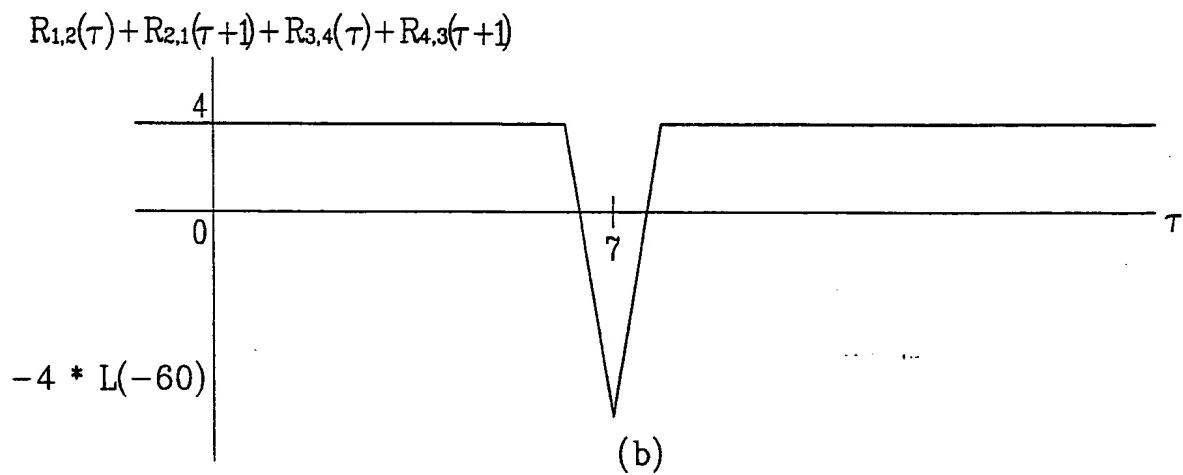


FIG. 23A

| Bit # | Npilot = 2 | | Npilot = 3 | | | Npilot = 4 | | | |
|---------|------------|---|------------|---|---|------------|---|---|---|
| | 0 | 1 | 0 | 1 | 2 | 0 | 1 | 2 | 3 |
| Slot #1 | 1 | 1 | 1 | 1 | 1 | 1 | 1 | 1 | 1 |
| 2 | 0 | 0 | 0 | 1 | 0 | 1 | 0 | 1 | 0 |
| 3 | 0 | 1 | 0 | 1 | 1 | 1 | 0 | 1 | 1 |
| 4 | 0 | 0 | 0 | 1 | 0 | 1 | 0 | 1 | 0 |
| 5 | 1 | 0 | 1 | 1 | 0 | 1 | 1 | 1 | 0 |
| 6 | 1 | 1 | 1 | 1 | 1 | 1 | 1 | 1 | 1 |
| 7 | 1 | 1 | 1 | 1 | 1 | 1 | 1 | 1 | 1 |
| 8 | 1 | 0 | 1 | 1 | 0 | 1 | 1 | 1 | 0 |
| 9 | 0 | 1 | 0 | 1 | 1 | 1 | 0 | 1 | 1 |
| 10 | 1 | 1 | 1 | 1 | 1 | 1 | 1 | 1 | 1 |
| 11 | 0 | 1 | 0 | 1 | 1 | 1 | 0 | 1 | 1 |
| 12 | 1 | 0 | 1 | 1 | 0 | 1 | 1 | 1 | 0 |
| 13 | 1 | 0 | 1 | 1 | 0 | 1 | 1 | 1 | 0 |
| 14 | 0 | 0 | 0 | 1 | 0 | 1 | 0 | 1 | 0 |
| 15 | 0 | 0 | 0 | 1 | 0 | 1 | 0 | 1 | 0 |

FIG. 23B

| Npilot | Pilot bit position # | Corresponding word of length 15 |
|--------|----------------------|---------------------------------|
| 2 | 0 | C ₁ |
| | 1 | C ₂ |
| 3 | 0 | C ₁ |
| | 2 | C ₂ |
| 4 | 1 | C ₁ |
| | 3 | C ₂ |

FIG. 23C

| Bit # | Npilot = 2 | | | Npilot = 3 | | | Npilot = 4 | | |
|---------|------------|---|---|------------|---|---|------------|---|---|
| | 0 | 1 | 0 | 1 | 2 | 0 | 1 | 2 | 3 |
| Slot #1 | 1 | 1 | 1 | 1 | 1 | 1 | 1 | 1 | 1 |
| 2 | 1 | 0 | 0 | 1 | 0 | 1 | 0 | 1 | 0 |
| 3 | 1 | 1 | 0 | 1 | 1 | 1 | 0 | 1 | 1 |
| 4 | 1 | 0 | 0 | 1 | 0 | 1 | 0 | 1 | 0 |
| 5 | 1 | 0 | 1 | 1 | 0 | 1 | 1 | 1 | 0 |
| 6 | 1 | 1 | 1 | 1 | 1 | 1 | 1 | 1 | 1 |
| 7 | 1 | 1 | 1 | 1 | 1 | 1 | 1 | 1 | 1 |
| 8 | 1 | 0 | 1 | 1 | 0 | 1 | 1 | 1 | 0 |
| 9 | 1 | 1 | 0 | 1 | 1 | 1 | 0 | 1 | 1 |
| 10 | 1 | 1 | 1 | 1 | 1 | 1 | 1 | 1 | 1 |
| 11 | 1 | 1 | 0 | 1 | 1 | 1 | 0 | 1 | 1 |
| 12 | 1 | 0 | 1 | 1 | 0 | 1 | 1 | 1 | 0 |
| 13 | 1 | 0 | 1 | 1 | 0 | 1 | 1 | 1 | 0 |
| 14 | 1 | 0 | 0 | 1 | 0 | 1 | 0 | 1 | 0 |
| 15 | 1 | 0 | 0 | 1 | 0 | 1 | 0 | 1 | 0 |

FIG. 23D

| Npilot | Pilot bit position # | Corresponding word of length 15 |
|--------|----------------------|---------------------------------|
| 2 | 1 | C ₁ |
| 3 | 0 | C ₁ |
| | 2 | C ₂ |
| 4 | 1 | C ₁ |
| | 3 | C ₂ |

FIG. 23E

| Bit # | Npilot = 5 | | | | | Npilot = 6 | | | | |
|---------|------------|---|---|---|---|------------|---|---|---|---|
| | 0 | 1 | 2 | 3 | 4 | 0 | 1 | 2 | 3 | 4 |
| Slot #1 | 1 | 1 | 1 | 1 | 0 | 1 | 1 | 1 | 1 | 1 |
| 2 | 0 | 0 | 1 | 1 | 0 | 1 | 0 | 0 | 1 | 1 |
| 3 | 0 | 1 | 1 | 0 | 1 | 1 | 0 | 1 | 1 | 0 |
| 4 | 0 | 0 | 1 | 0 | 0 | 1 | 0 | 0 | 1 | 0 |
| 5 | 1 | 0 | 1 | 0 | 1 | 1 | 1 | 0 | 1 | 0 |
| 6 | 1 | 1 | 1 | 1 | 0 | 1 | 1 | 1 | 1 | 0 |
| 7 | 1 | 1 | 1 | 0 | 0 | 1 | 1 | 1 | 1 | 0 |
| 8 | 1 | 0 | 1 | 0 | 0 | 1 | 1 | 0 | 1 | 0 |
| 9 | 0 | 1 | 1 | 1 | 0 | 1 | 0 | 1 | 1 | 1 |
| 10 | 1 | 1 | 1 | 1 | 1 | 1 | 1 | 1 | 1 | 1 |
| 11 | 0 | 1 | 1 | 0 | 1 | 1 | 0 | 1 | 1 | 0 |
| 12 | 1 | 0 | 1 | 1 | 1 | 1 | 1 | 0 | 1 | 1 |
| 13 | 1 | 0 | 1 | 0 | 0 | 1 | 1 | 0 | 1 | 0 |
| 14 | 0 | 0 | 1 | 1 | 1 | 1 | 0 | 0 | 1 | 1 |
| 15 | 0 | 0 | 1 | 1 | 1 | 1 | 0 | 0 | 1 | 1 |

FIG. 23F

| Bit # | Npilot = 7 | | | | | | Npilot = 8 | | | | | | | |
|---------|------------|---|---|---|---|---|------------|---|---|---|---|---|---|---|
| | 0 | 1 | 2 | 3 | 4 | 5 | 6 | 0 | 1 | 2 | 3 | 4 | 5 | 6 |
| Slot #1 | 1 | 1 | 1 | 1 | 1 | 0 | 1 | 1 | 1 | 1 | 1 | 1 | 1 | 0 |
| 2 | 1 | 0 | 0 | 1 | 1 | 0 | 1 | 1 | 0 | 1 | 0 | 1 | 1 | 0 |
| 3 | 1 | 0 | 1 | 1 | 0 | 1 | 1 | 1 | 0 | 1 | 1 | 1 | 0 | 1 |
| 4 | 1 | 0 | 0 | 1 | 0 | 0 | 1 | 1 | 0 | 1 | 0 | 1 | 0 | 1 |
| 5 | 1 | 1 | 0 | 1 | 0 | 1 | 1 | 1 | 1 | 0 | 1 | 0 | 1 | 1 |
| 6 | 1 | 1 | 1 | 1 | 1 | 0 | 1 | 1 | 1 | 1 | 1 | 1 | 1 | 0 |
| 7 | 1 | 1 | 1 | 1 | 0 | 0 | 1 | 1 | 1 | 1 | 1 | 0 | 1 | 0 |
| 8 | 1 | 1 | 0 | 1 | 0 | 0 | 1 | 1 | 1 | 0 | 1 | 0 | 1 | 0 |
| 9 | 1 | 0 | 1 | 1 | 1 | 0 | 1 | 1 | 0 | 1 | 1 | 1 | 1 | 0 |
| 10 | 1 | 1 | 1 | 1 | 1 | 1 | 1 | 1 | 1 | 1 | 1 | 1 | 1 | 1 |
| 11 | 1 | 0 | 1 | 1 | 0 | 1 | 1 | 1 | 0 | 1 | 1 | 1 | 0 | 1 |
| 12 | 1 | 1 | 0 | 1 | 1 | 1 | 1 | 1 | 1 | 0 | 1 | 1 | 1 | 1 |
| 13 | 1 | 1 | 0 | 1 | 0 | 0 | 1 | 1 | 1 | 0 | 1 | 0 | 1 | 0 |
| 14 | 1 | 0 | 0 | 1 | 1 | 1 | 1 | 1 | 0 | 1 | 0 | 1 | 1 | 1 |
| 15 | 1 | 0 | 0 | 1 | 1 | 1 | 1 | 1 | 0 | 1 | 0 | 1 | 1 | 1 |

FIG. 23G

| N_{pilot} | Pilot bit position # | Corresponding word of length 15 |
|--------------------|----------------------|------------------------------------|
| 5 | 0 | C_1 |
| | 1 | C_2 |
| | 3 | C_3 |
| | 4 | C_4 |
| 6 | 1 | C_1 |
| | 2 | C_2 |
| | 4 | C_3 |
| | 5 | C_4 |
| 7 | 1 | C_1 |
| | 2 | C_2 |
| | 4 | C_3 |
| | 5 | C_4 |
| 8 | 1 | C_1 |
| | 3 | C_2 |
| | 5 | C_3 |
| | 7 | C_4 |

FIG. 23H

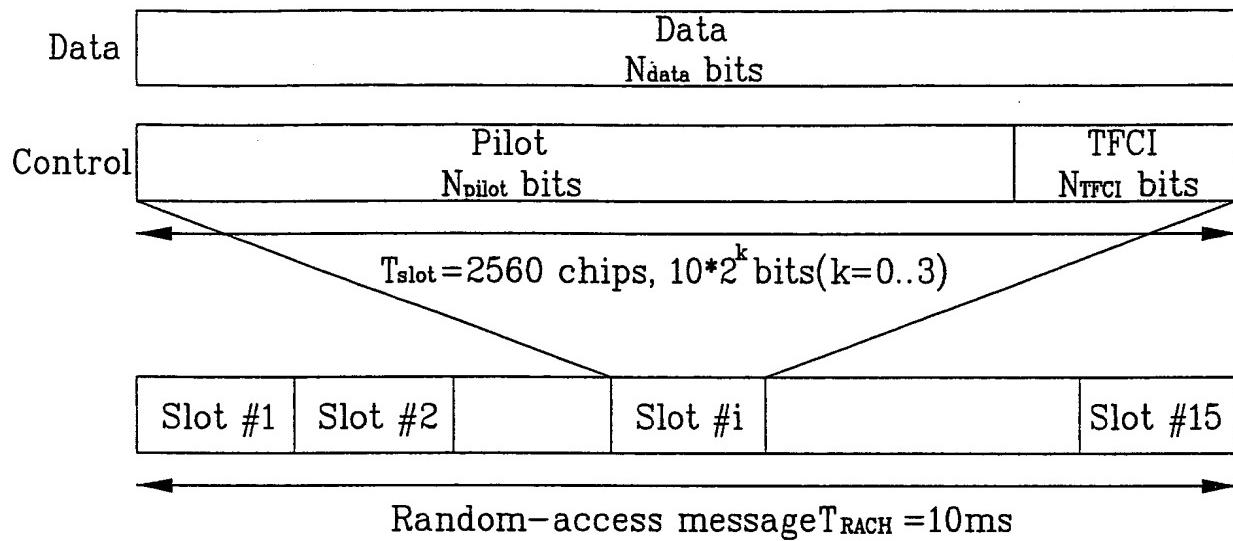


FIG. 23I

| Channel Bit Rate(kbps) | Channel Symbol Rate(ksps) | SF | Bits/Frame | Bits/Slot | N_{pilot} | N_{TFCI} |
|------------------------|---------------------------|-----|------------|-----------|--------------------|-------------------|
| 15 | 15 | 256 | 150 | 10 | 8 | 2 |

FIG. 23J

| Bit # | 0 | 1 | 2 | 3 | 4 | 5 | 6 | 7 |
|---------|---|---|---|---|---|---|---|---|
| Slot #1 | 1 | 1 | 1 | 1 | 1 | 1 | 1 | 0 |
| 2 | 1 | 0 | 1 | 0 | 1 | 1 | 1 | 0 |
| 3 | 1 | 0 | 1 | 1 | 1 | 0 | 1 | 1 |
| 4 | 1 | 0 | 1 | 0 | 1 | 0 | 1 | 0 |
| 5 | 1 | 1 | 1 | 0 | 1 | 0 | 1 | 1 |
| 6 | 1 | 1 | 1 | 1 | 1 | 1 | 1 | 0 |
| 7 | 1 | 1 | 1 | 1 | 1 | 0 | 1 | 0 |
| 8 | 1 | 1 | 1 | 0 | 1 | 0 | 1 | 0 |
| 9 | 1 | 0 | 1 | 1 | 1 | 1 | 1 | 0 |
| 10 | 1 | 1 | 1 | 1 | 1 | 1 | 1 | 1 |
| 11 | 1 | 0 | 1 | 1 | 1 | 0 | 1 | 1 |
| 12 | 1 | 1 | 1 | 0 | 1 | 1 | 1 | 1 |
| 13 | 1 | 1 | 1 | 0 | 1 | 0 | 1 | 0 |
| 14 | 1 | 0 | 1 | 0 | 1 | 1 | 1 | 1 |
| 15 | 1 | 0 | 1 | 0 | 1 | 1 | 1 | 1 |

FIG. 24A

| Symbol # | N _{pilot} = 2 | | N _{pilot} = 4 | | N _{pilot} = 8 | | | | N _{pilot} = 16 | | | | | | | |
|----------|------------------------|-------|------------------------|----|------------------------|----|----|----|-------------------------|----|----|----|----|----|--|--|
| | 0 | 1 | 0 | 1 | 2 | 3 | 0 | 1 | 2 | 3 | 4 | 5 | 6 | 7 | | |
| Slot #1 | 11 | 11 11 | 11 | 11 | 11 | 10 | 11 | 11 | 11 | 10 | 11 | 11 | 11 | 10 | | |
| 2 | 00 | 11 00 | 11 | 00 | 11 | 10 | 11 | 00 | 11 | 10 | 11 | 11 | 11 | 00 | | |
| 3 | 01 | 11 01 | 11 | 01 | 11 | 01 | 11 | 01 | 11 | 01 | 11 | 10 | 11 | 00 | | |
| 4 | 00 | 11 00 | 11 | 00 | 11 | 00 | 11 | 00 | 11 | 00 | 11 | 01 | 11 | 10 | | |
| 5 | 10 | 11 10 | 11 | 10 | 11 | 01 | 11 | 10 | 11 | 01 | 11 | 11 | 11 | 11 | | |
| 6 | 11 | 11 11 | 11 | 11 | 11 | 10 | 11 | 11 | 11 | 10 | 11 | 01 | 11 | 01 | | |
| 7 | 11 | 11 11 | 11 | 11 | 11 | 00 | 11 | 11 | 11 | 00 | 11 | 10 | 11 | 11 | | |
| 8 | 10 | 11 10 | 11 | 10 | 11 | 00 | 11 | 10 | 11 | 00 | 11 | 10 | 11 | 00 | | |
| 9 | 01 | 11 01 | 11 | 01 | 11 | 10 | 11 | 01 | 11 | 10 | 11 | 00 | 11 | 11 | | |
| 10 | 11 | 11 11 | 11 | 11 | 11 | 11 | 11 | 11 | 11 | 11 | 11 | 00 | 11 | 11 | | |
| 11 | 01 | 11 01 | 11 | 01 | 11 | 01 | 11 | 01 | 11 | 01 | 11 | 11 | 11 | 10 | | |
| 12 | 10 | 11 10 | 11 | 10 | 11 | 11 | 11 | 10 | 11 | 11 | 11 | 00 | 11 | 10 | | |
| 13 | 10 | 11 10 | 11 | 10 | 11 | 00 | 11 | 10 | 11 | 00 | 11 | 01 | 11 | 01 | | |
| 14 | 00 | 11 00 | 11 | 00 | 11 | 11 | 11 | 00 | 11 | 11 | 11 | 00 | 11 | 00 | | |
| 15 | 00 | 11 00 | 11 | 00 | 11 | 11 | 11 | 00 | 11 | 11 | 11 | 10 | 11 | 01 | | |

FIG. 24B

| Symbol rate | Symbol | Channel | Corresponding word of length 15 |
|-------------------------|--------|---------|---------------------------------|
| N _{pilot} = 2 | 0 | I-CH | C ₁ |
| | | Q-CH | C ₂ |
| N _{pilot} = 4 | 1 | I-CH | C ₁ |
| | | Q-CH | C ₂ |
| N _{pilot} = 8 | 1 | I-CH | C ₁ |
| | | Q-CH | C ₂ |
| | 3 | I-CH | C ₃ |
| | | Q-CH | C ₄ |
| N _{pilot} = 16 | 1 | I-CH | C ₁ |
| | | Q-CH | C ₂ |
| | 3 | I-CH | C ₃ |
| | | Q-CH | C ₄ |
| | 5 | I-CH | C ₅ |
| | | Q-CH | C ₆ |
| | 7 | I-CH | C ₇ |
| | | Q-CH | C ₈ |

FIG. 24C

| Symbol # | Npilot = 4 | | Npilot = 8 | | | Npilot = 16 | | | | | | | | | |
|----------|------------|----|------------|----|----|-------------|----|----|----|----|----|----|----|----|--|
| | 0 | 1 | 0 | 1 | 2 | 3 | 0 | 1 | 2 | 3 | 4 | 5 | 6 | 7 | |
| Slot #1 | 01 | 10 | 11 | 00 | 00 | 10 | 11 | 00 | 00 | 10 | 11 | 00 | 00 | 10 | |
| 2 | 10 | 10 | 11 | 00 | 00 | 01 | 11 | 00 | 00 | 01 | 11 | 10 | 00 | 10 | |
| 3 | 11 | 10 | 11 | 11 | 00 | 00 | 11 | 11 | 00 | 00 | 11 | 10 | 00 | 11 | |
| 4 | 10 | 10 | 11 | 10 | 00 | 01 | 11 | 10 | 00 | 01 | 11 | 00 | 00 | 00 | |
| 5 | 00 | 10 | 11 | 11 | 00 | 11 | 11 | 11 | 00 | 11 | 11 | 01 | 00 | 10 | |
| 6 | 01 | 10 | 11 | 00 | 00 | 10 | 11 | 00 | 00 | 10 | 11 | 11 | 00 | 00 | |
| 7 | 01 | 10 | 11 | 10 | 00 | 10 | 11 | 10 | 00 | 10 | 11 | 01 | 00 | 11 | |
| 8 | 00 | 10 | 11 | 10 | 00 | 11 | 11 | 10 | 00 | 11 | 11 | 10 | 00 | 11 | |
| 9 | 11 | 10 | 11 | 00 | 00 | 00 | 11 | 00 | 00 | 00 | 11 | 01 | 00 | 01 | |
| 10 | 01 | 10 | 11 | 01 | 00 | 10 | 11 | 01 | 00 | 10 | 11 | 01 | 00 | 01 | |
| 11 | 11 | 10 | 11 | 11 | 00 | 00 | 11 | 11 | 00 | 00 | 11 | 00 | 00 | 10 | |
| 12 | 00 | 10 | 11 | 01 | 00 | 11 | 11 | 01 | 00 | 11 | 11 | 00 | 00 | 01 | |
| 13 | 00 | 10 | 11 | 10 | 00 | 11 | 11 | 10 | 00 | 11 | 11 | 11 | 00 | 00 | |
| 14 | 10 | 10 | 11 | 01 | 00 | 01 | 11 | 01 | 00 | 01 | 11 | 10 | 00 | 01 | |
| 15 | 10 | 10 | 11 | 01 | 00 | 01 | 11 | 01 | 00 | 01 | 11 | 11 | 00 | 11 | |

FIG. 24D

| Symbol rate | Symbol # | Channel | Corresponding word of length 15 |
|-------------------------|----------|---------|---------------------------------|
| $N_{\text{pilot}} = 4$ | 0 | I-CH | $-C_1$ |
| | | Q-CH | C_2 |
| $N_{\text{pilot}} = 8$ | 1 | I-CH | $-C_3$ |
| | | Q-CH | C_4 |
| | 3 | I-CH | C_1 |
| | | Q-CH | $-C_2$ |
| $N_{\text{pilot}} = 16$ | 1 | I-CH | $-C_3$ |
| | | Q-CH | C_4 |
| | 3 | I-CH | C_1 |
| | | Q-CH | $-C_2$ |
| | 5 | I-CH | $-C_7$ |
| | | Q-CH | C_8 |
| | 7 | I-CH | C_5 |
| | | Q-CH | $-C_6$ |

FIG. 25A

| Symbol # | N _{pilot} = 8 | | | | N _{pilot} = 16 | | | | | | | |
|----------|------------------------|----|----|----|-------------------------|----|----|----|----|----|----|----|
| | 0 | 1 | 2 | 3 | 0 | 1 | 2 | 3 | 4 | 5 | 6 | 7 |
| Slot #1 | 11 | 11 | 11 | 10 | 11 | 11 | 11 | 10 | 11 | 11 | 11 | 10 |
| 2 | 11 | 00 | 11 | 10 | 11 | 00 | 11 | 10 | 11 | 11 | 11 | 00 |
| 3 | 11 | 01 | 11 | 01 | 11 | 01 | 11 | 01 | 11 | 10 | 11 | 00 |
| 4 | 11 | 00 | 11 | 00 | 11 | 00 | 11 | 00 | 11 | 01 | 11 | 10 |
| 5 | 11 | 10 | 11 | 01 | 11 | 10 | 11 | 01 | 11 | 11 | 11 | 11 |
| 6 | 11 | 11 | 11 | 10 | 11 | 11 | 11 | 10 | 11 | 01 | 11 | 01 |
| 7 | 11 | 11 | 11 | 00 | 11 | 11 | 11 | 00 | 11 | 10 | 11 | 11 |
| 8 | 11 | 10 | 11 | 00 | 11 | 10 | 11 | 00 | 11 | 10 | 11 | 00 |
| 9 | 11 | 01 | 11 | 10 | 11 | 01 | 11 | 10 | 11 | 00 | 11 | 11 |
| 10 | 11 | 11 | 11 | 11 | 11 | 11 | 11 | 11 | 11 | 00 | 11 | 11 |
| 11 | 11 | 01 | 11 | 01 | 11 | 01 | 11 | 01 | 11 | 11 | 11 | 10 |
| 12 | 11 | 10 | 11 | 11 | 11 | 10 | 11 | 11 | 11 | 00 | 11 | 10 |
| 13 | 11 | 10 | 11 | 00 | 11 | 10 | 11 | 00 | 11 | 01 | 11 | 01 |
| 14 | 11 | 00 | 11 | 11 | 11 | 00 | 11 | 11 | 11 | 00 | 11 | 00 |
| 15 | 11 | 00 | 11 | 11 | 11 | 00 | 11 | 11 | 11 | 10 | 11 | 01 |

FIG. 25B

| Symbol rate | Symbol # | Channel | Corresponding word of length 15 |
|-------------------------|----------|---------|---------------------------------|
| N _{pilot} = 8 | 1 | I-CH | C ₁ |
| | | Q-CH | C ₂ |
| | 3 | I-CH | C ₃ |
| | | Q-CH | C ₄ |
| N _{pilot} = 16 | 1 | I-CH | C ₁ |
| | | Q-CH | C ₂ |
| | 3 | I-CH | C ₃ |
| | | Q-CH | C ₄ |
| | 5 | I-CH | C ₅ |
| | | Q-CH | C ₆ |
| | 7 | I-CH | C ₇ |
| | | Q-CH | C ₈ |

FIG. 25C

| Symbol # | N _{pilot} = 8 | | | | N _{pilot} = 16 | | | | | | | |
|----------|------------------------|----|----|----|-------------------------|----|----|----|----|----|----|----|
| | 0 | 1 | 2 | 3 | 0 | 1 | 2 | 3 | 4 | 5 | 6 | 7 |
| Slot #1 | 11 | 00 | 00 | 10 | 11 | 00 | 00 | 10 | 11 | 00 | 00 | 10 |
| 2 | 11 | 00 | 00 | 01 | 11 | 00 | 00 | 01 | 11 | 10 | 00 | 10 |
| 3 | 11 | 11 | 00 | 00 | 11 | 11 | 00 | 00 | 11 | 10 | 00 | 11 |
| 4 | 11 | 10 | 00 | 01 | 11 | 10 | 00 | 01 | 11 | 00 | 00 | 00 |
| 5 | 11 | 11 | 00 | 11 | 11 | 11 | 00 | 11 | 11 | 01 | 00 | 10 |
| 6 | 11 | 00 | 00 | 10 | 11 | 00 | 00 | 10 | 11 | 11 | 00 | 00 |
| 7 | 11 | 10 | 00 | 10 | 11 | 10 | 00 | 10 | 11 | 01 | 00 | 11 |
| 8 | 11 | 10 | 00 | 11 | 11 | 10 | 00 | 11 | 11 | 10 | 00 | 11 |
| 9 | 11 | 00 | 00 | 00 | 11 | 00 | 00 | 00 | 11 | 01 | 00 | 01 |
| 10 | 11 | 01 | 00 | 10 | 11 | 01 | 00 | 10 | 11 | 01 | 00 | 01 |
| 11 | 11 | 11 | 00 | 00 | 11 | 11 | 00 | 00 | 11 | 00 | 00 | 10 |
| 12 | 11 | 01 | 00 | 11 | 11 | 01 | 00 | 11 | 11 | 00 | 00 | 01 |
| 13 | 11 | 10 | 00 | 11 | 11 | 10 | 00 | 11 | 11 | 11 | 00 | 00 |
| 14 | 11 | 01 | 00 | 01 | 11 | 01 | 00 | 01 | 11 | 10 | 00 | 01 |
| 15 | 11 | 01 | 00 | 01 | 11 | 01 | 00 | 01 | 11 | 11 | 00 | 11 |

FIG. 25D

| Symbol rate | Symbol # | Channel | Corresponding word of length 15 |
|-------------------------|----------|---------|---------------------------------|
| N _{pilot} = 8 | 1 | I-CH | -C ₃ |
| | | Q-CH | C ₄ |
| | 3 | I-CH | C ₁ |
| | | Q-CH | C ₂ |
| N _{pilot} = 16 | 1 | I-CH | -C ₃ |
| | | Q-CH | C ₄ |
| | 3 | I-CH | C ₁ |
| | | Q-CH | -C ₂ |
| | 5 | I-CH | -C ₇ |
| | | Q-CH | C ₈ |
| | 7 | I-CH | C ₅ |
| | | Q-CH | -C ₆ |

FIG. 26A

| Parameters | Uplink |
|---|------------------------------------|
| Number of slots per frame | 15 |
| Number of bits in the DPCCH(Pilot/TPC/TFCI/FBI) | 6/2/2/0 |
| Number of bits in the DPDCH per each slot | 10 |
| Spreading factor (DPDCH) | 256 |
| Spreading factor (DPCCH) | 256 |
| Modulation | HPSK |
| 3dB bandwidth | 3.84MHz |
| Shaping filter | Root raised cosine (roll off 0.22) |
| Power amplifier | Ideal |
| Propagation channel | AWGN |

FIG. 26B

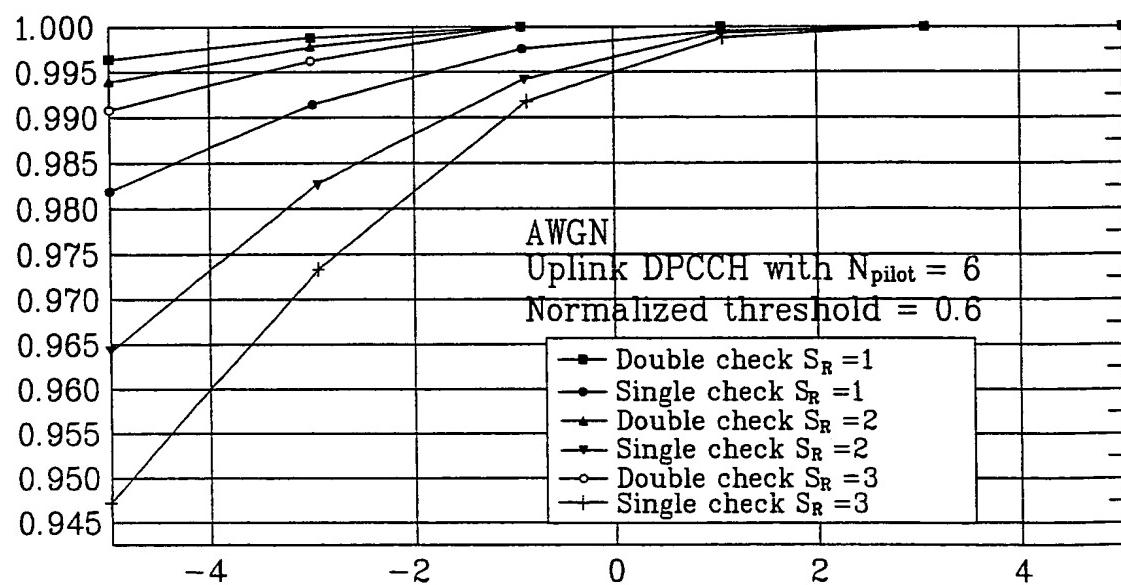


FIG. 26C

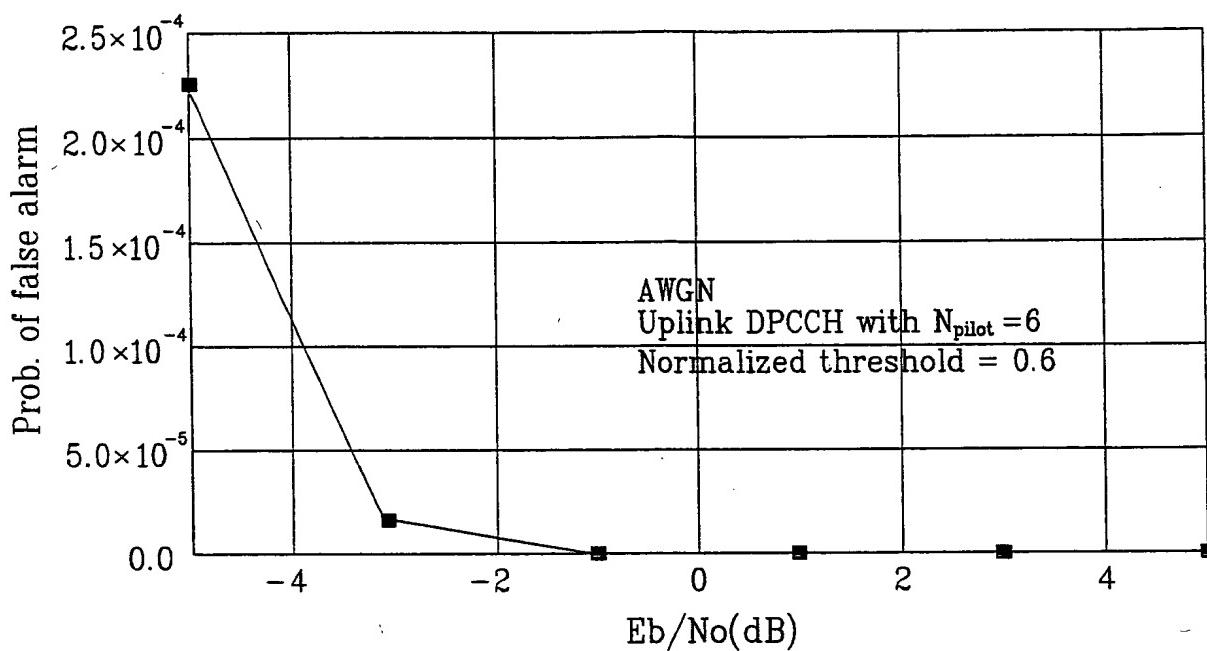


FIG. 27

| Item | 15 slots | 16 slots |
|--|--|--|
| No. of slots per frame | 15 | 16 |
| No. of N_{PA} per slot | 1) Uplink 2,3,4,5,6,7,8 2) Downlink 2,4,8,16 | 1) Uplink 5,6,7,8 2) Downlink 4,8,16,32 |
| Slot-Slot possible? | Yes | Yes |
| Double-check possible? | Yes (Two correlators such as auto-correlator and cross-correlator are used) | Yes (Auto-correlator) |
| Single frame synchronization word can be used for frame synchronization? | Yes since a frame synchronization word has -1 out-of-phase coefficients | May not be feasible because of +4 or -4 out-of-phase coefficients. The +4 or -4 side lobes can be zero through some particular processing using preferred pair of frame synchronization words. |
| Frame synchronization words | All 8 frame synchronization words are made out of a single PN code | All 8 frame synchronization words have +4 or -4 out-of-phase coefficient and minus peak value at middle shift. |
| Autocorrelation function | $R(\tau)=15, \tau=0$ $R(\tau)=-1, \text{ elsewhere}$ | $R(\tau)=16, \tau=0$ $R(\tau)=-16, \tau=8$ $R(\tau)=0+4, \text{ or } -4, \text{ elsewhere}$ |
| | | |

FIG. 28A

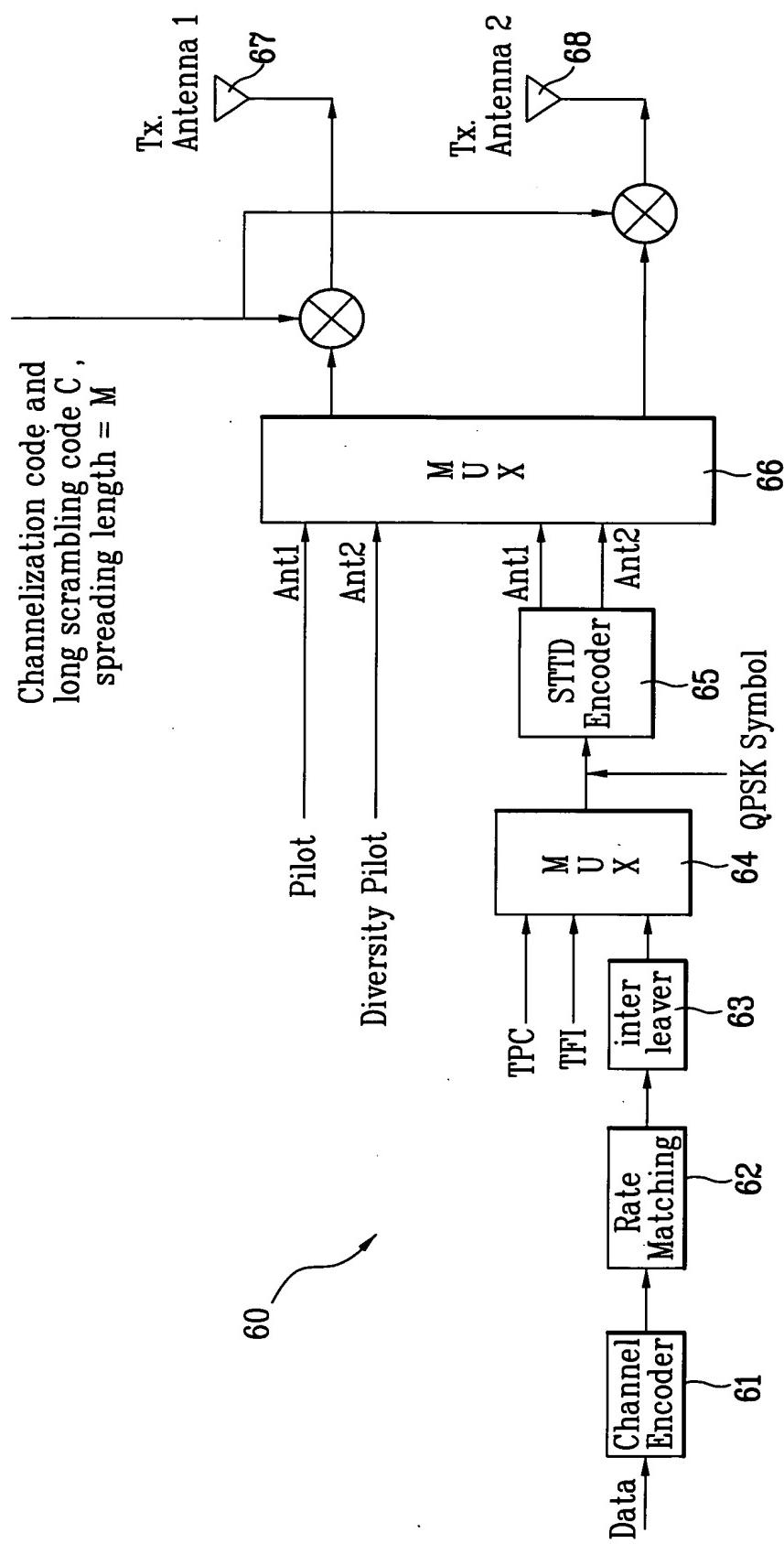


FIG. 28B

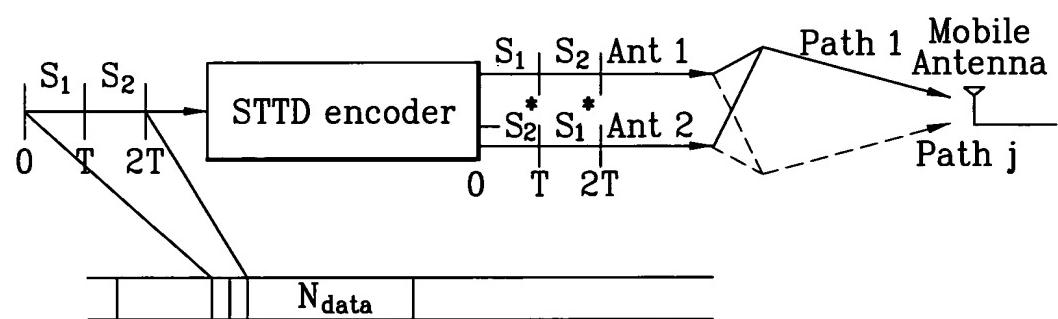


FIG. 29A

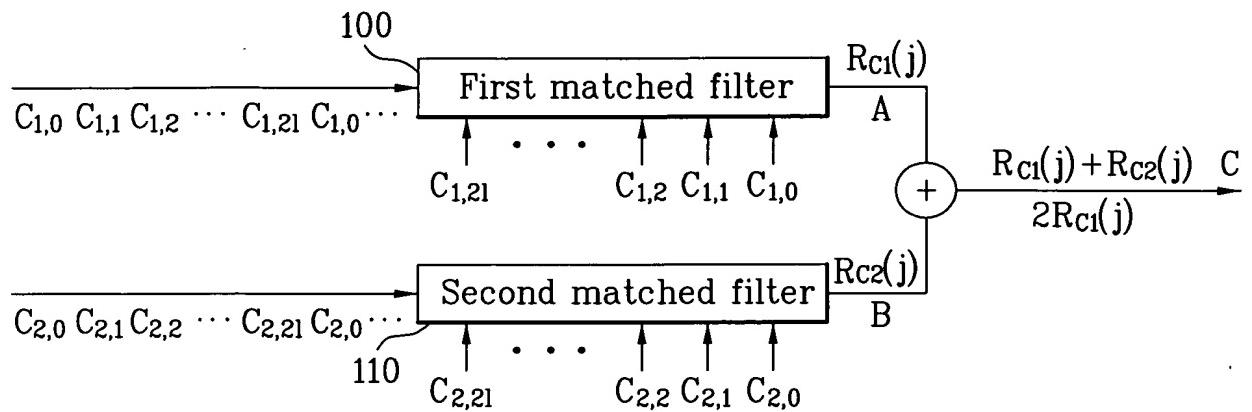


FIG. 29B

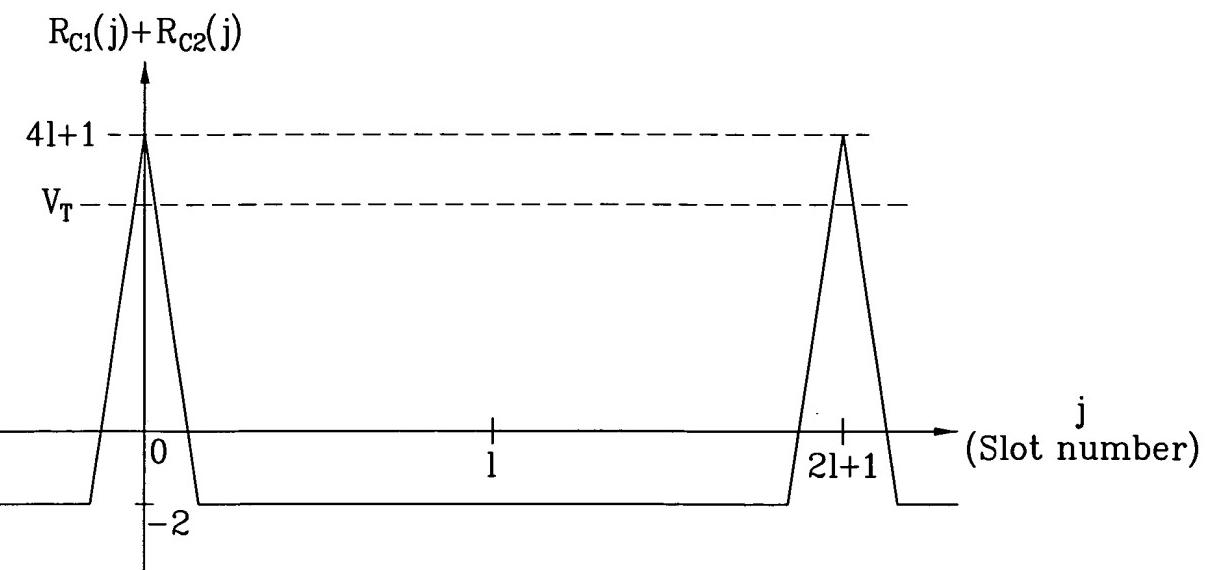


FIG. 30A

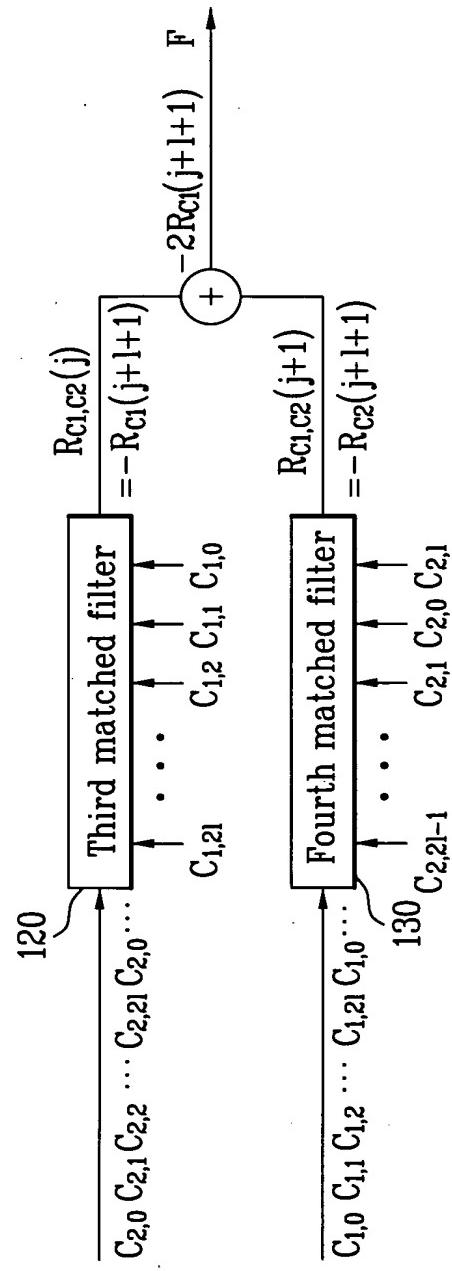


FIG. 30B

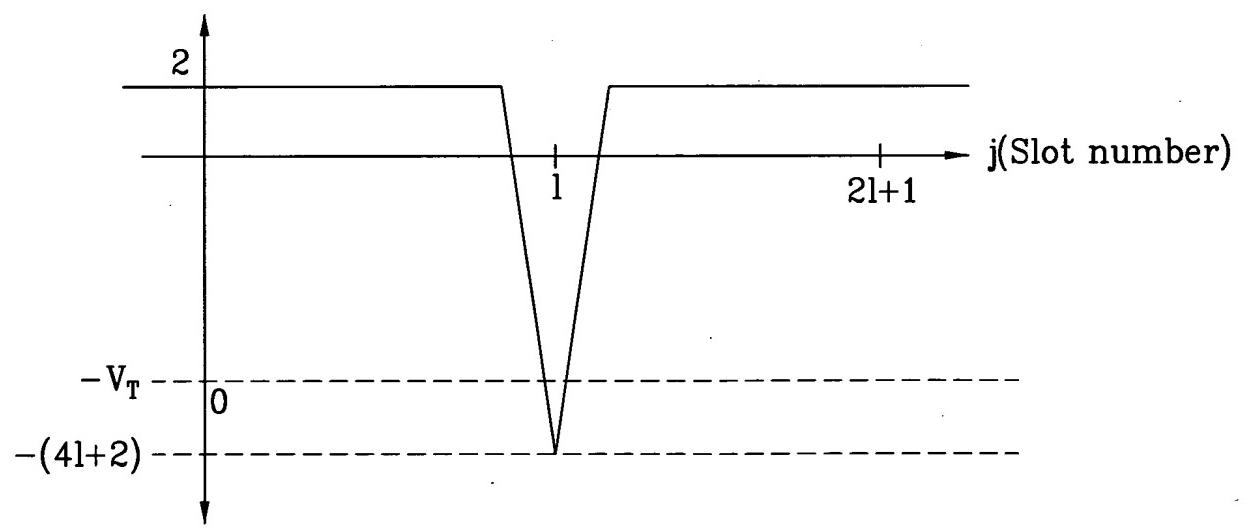


FIG. 31

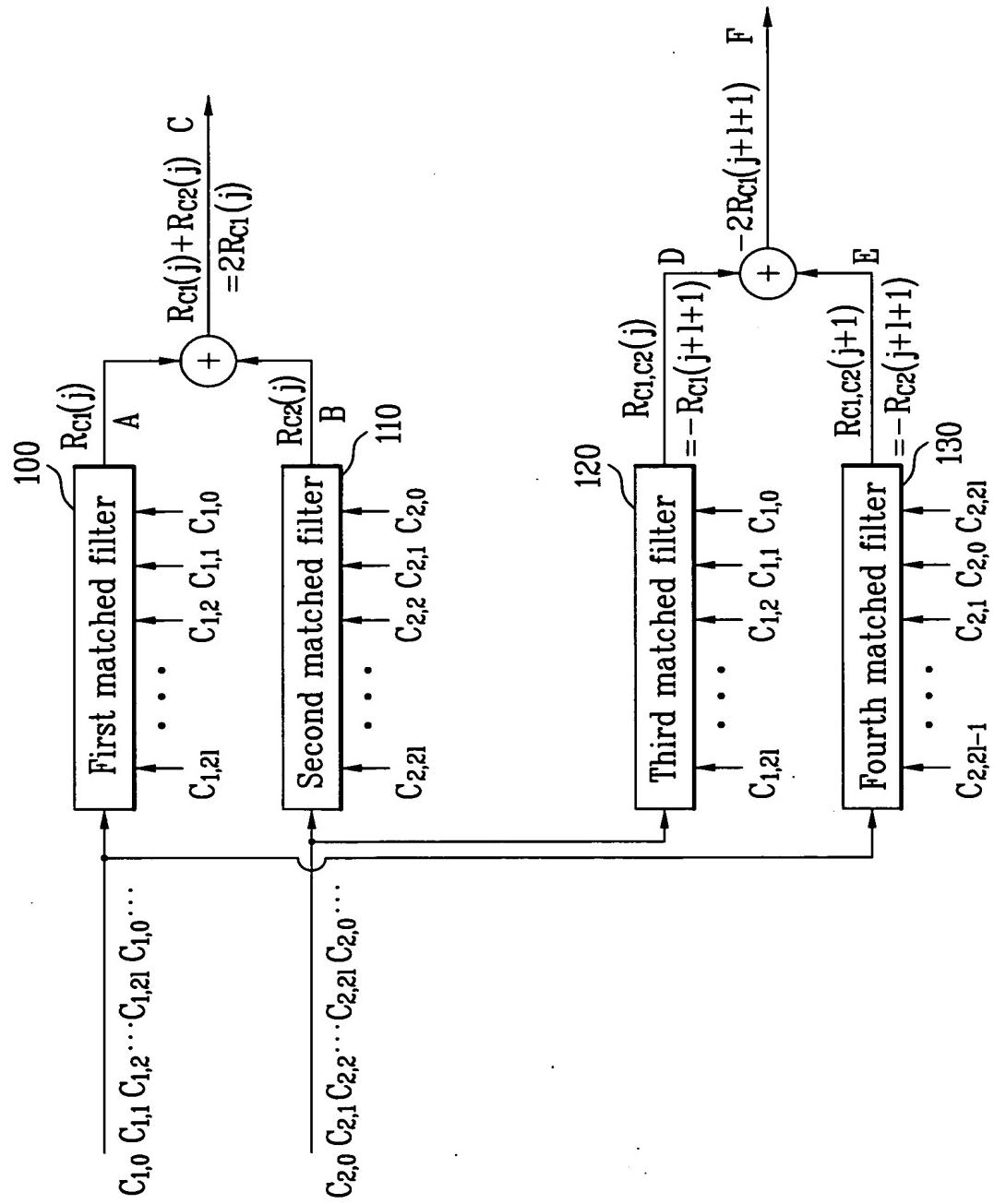


FIG. 32A

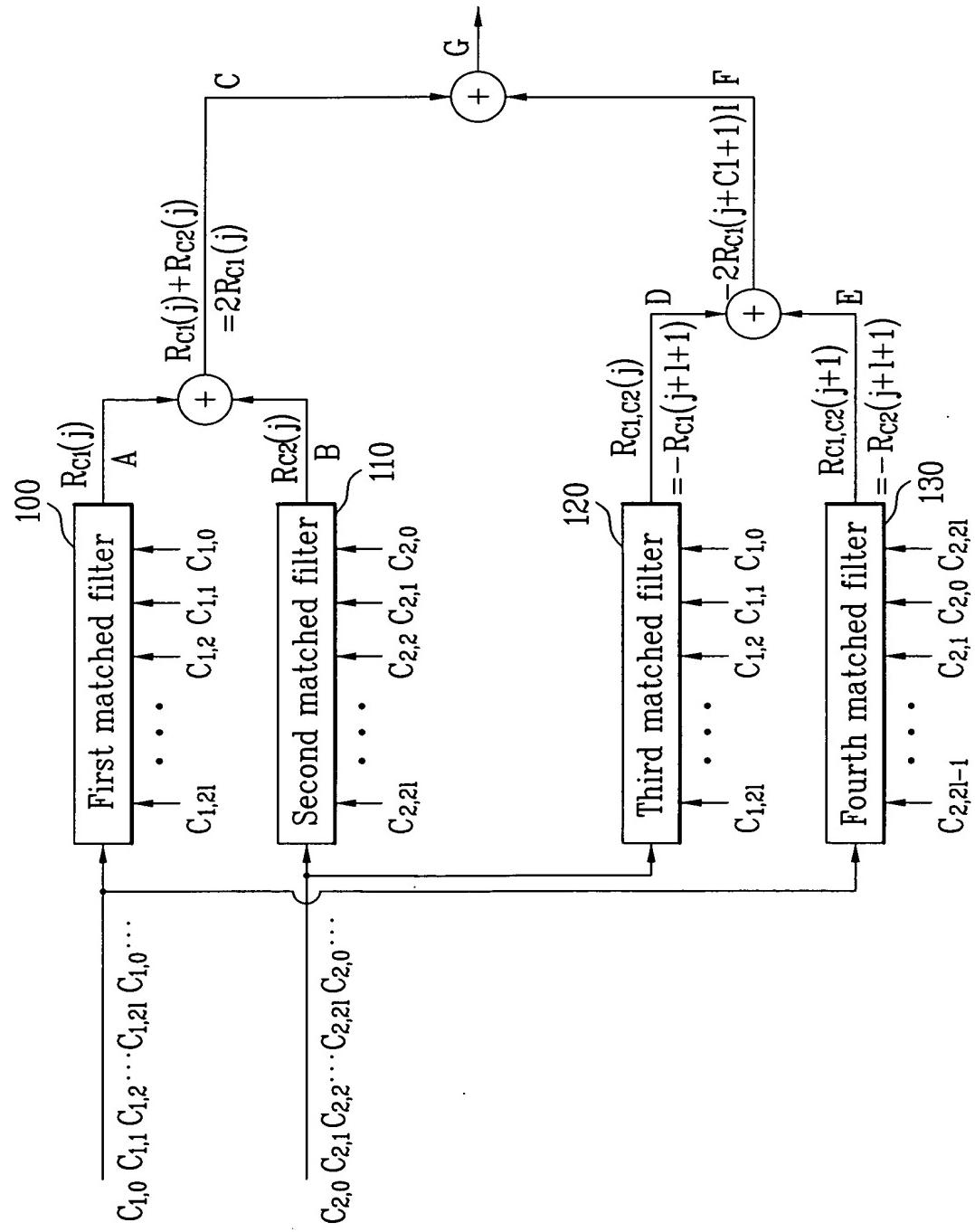


FIG. 32B

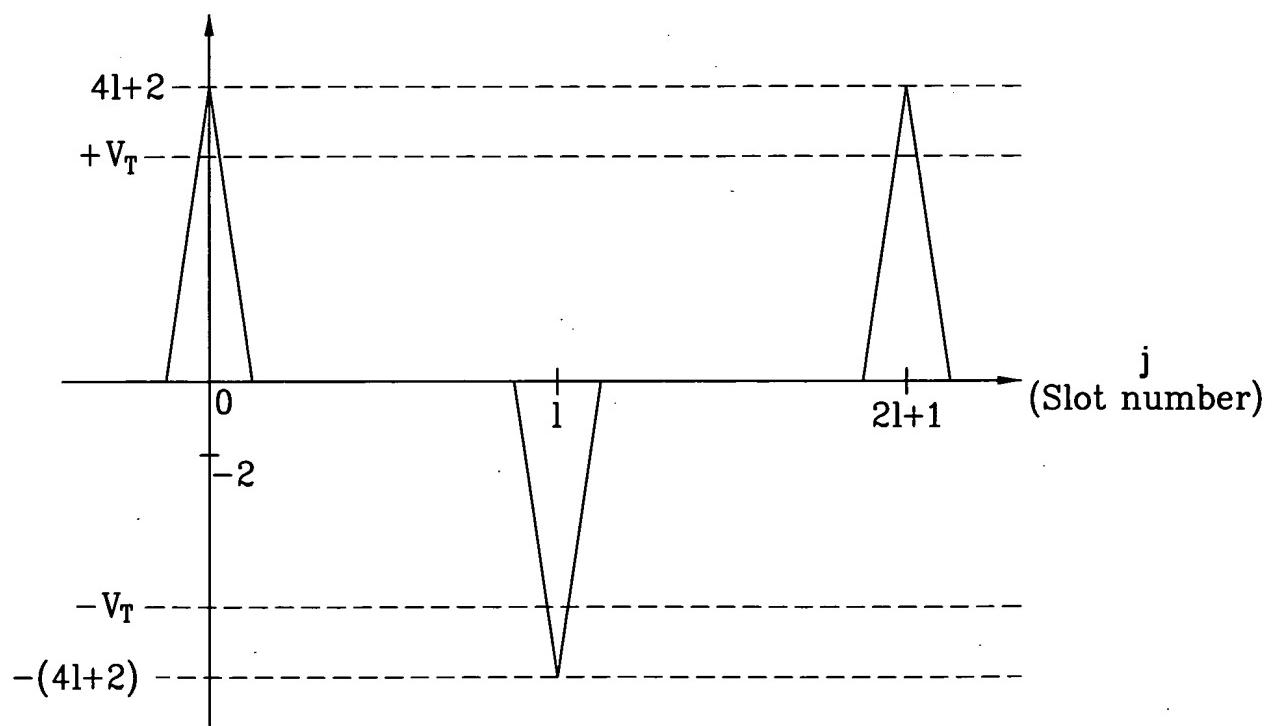


FIG. 33A

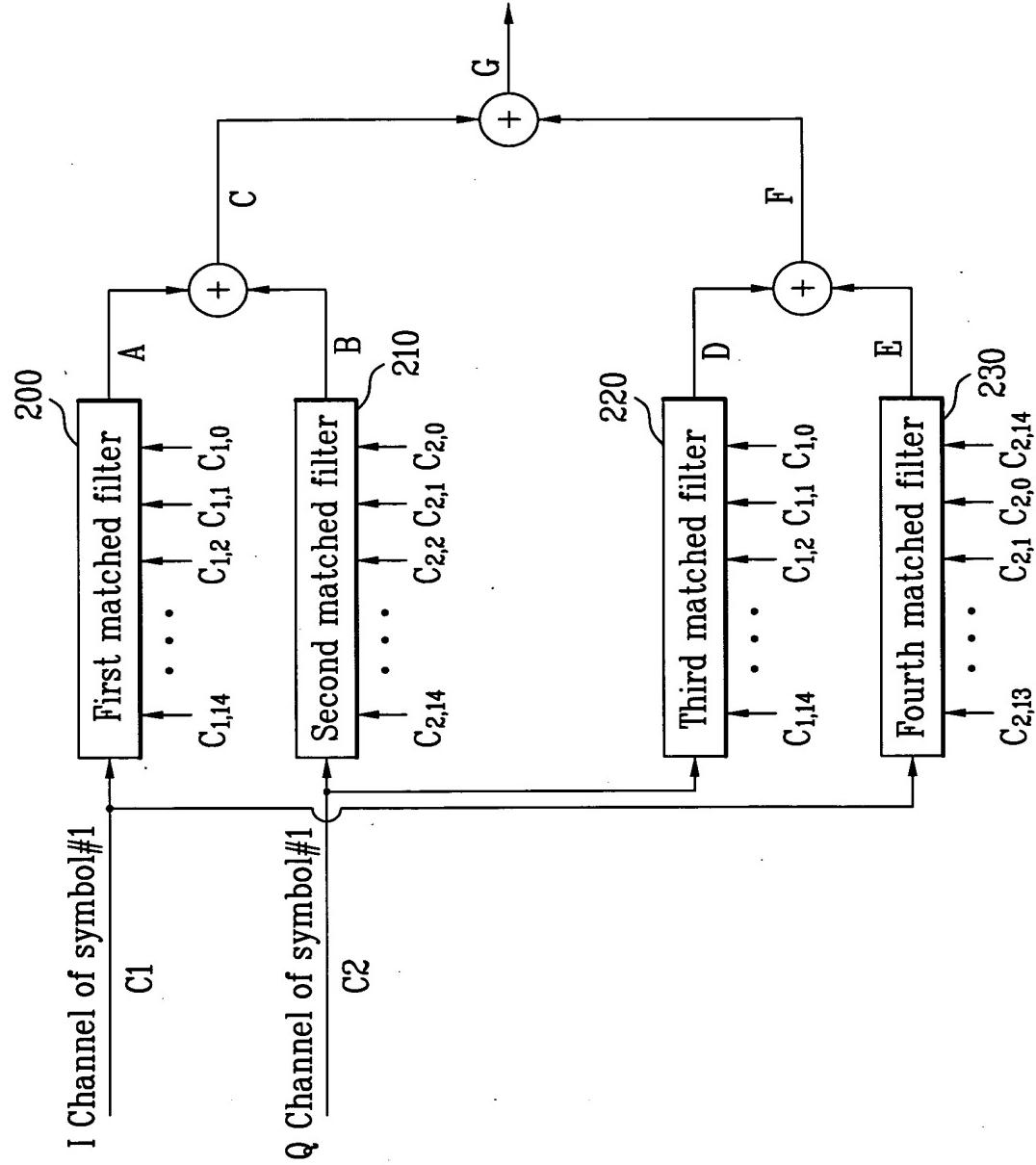


FIG. 33B

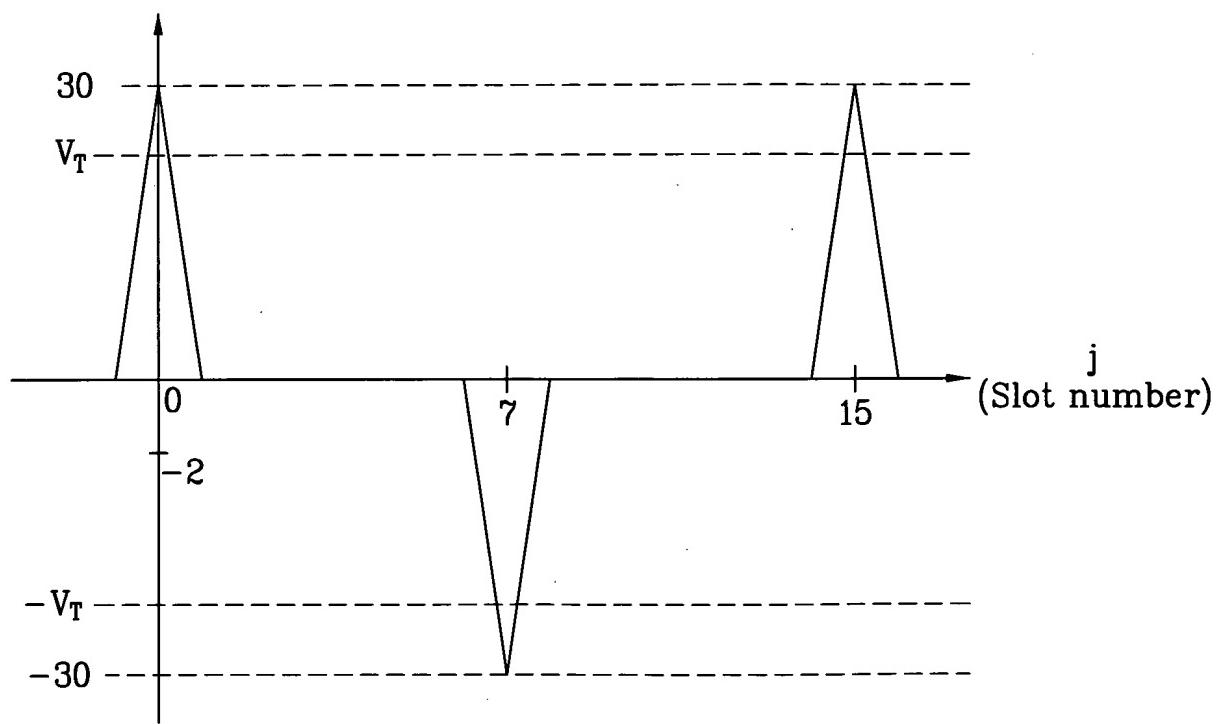


FIG. 34

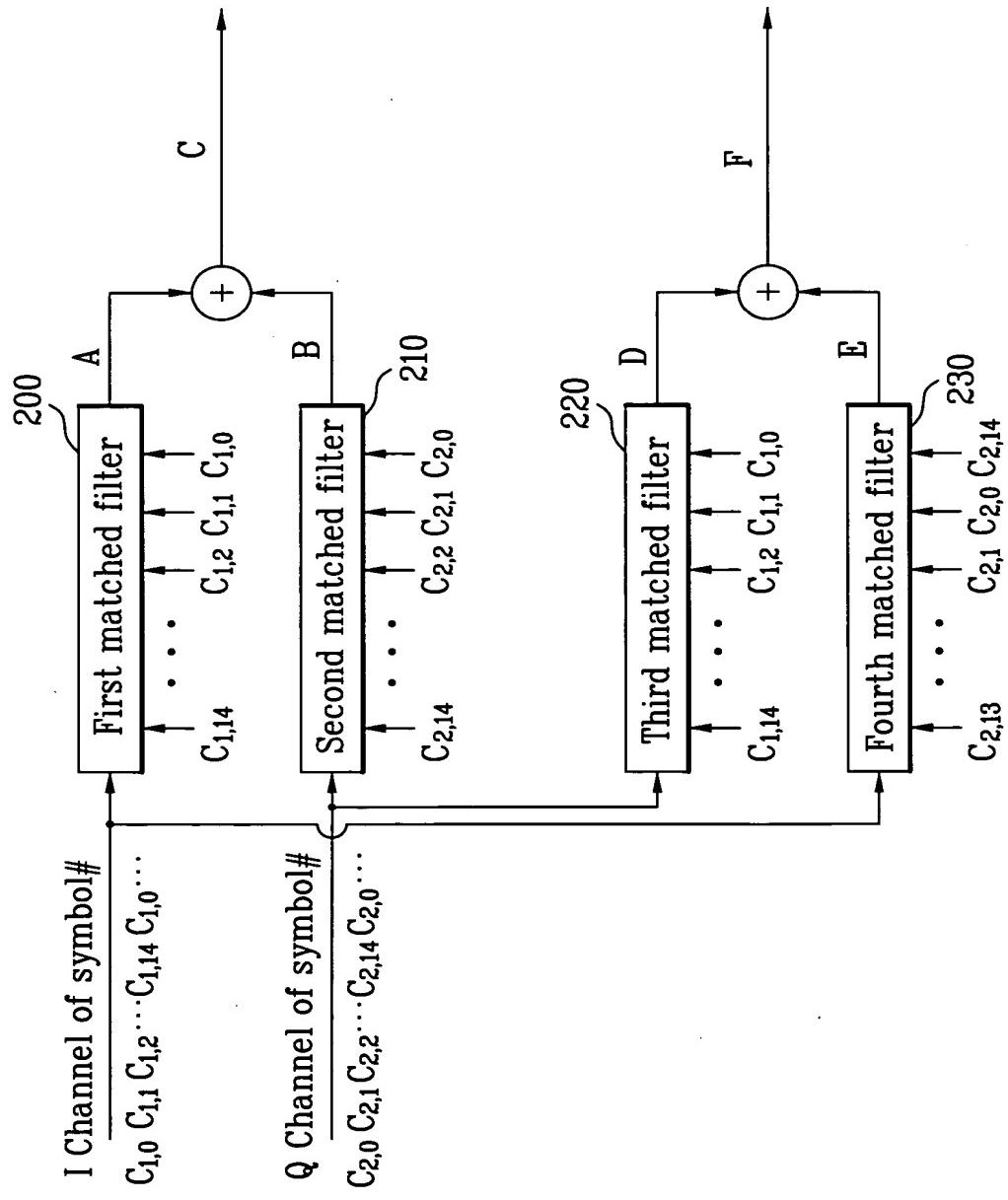


FIG. 35A

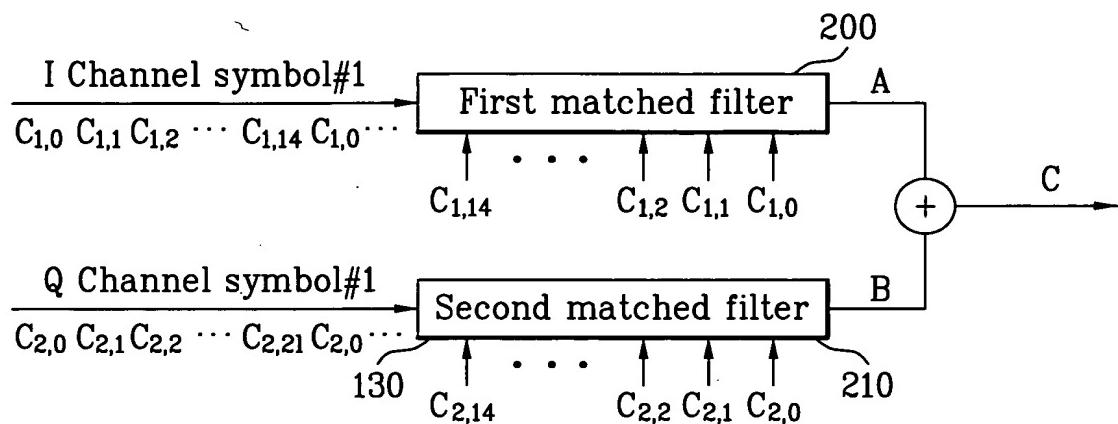


FIG. 35B

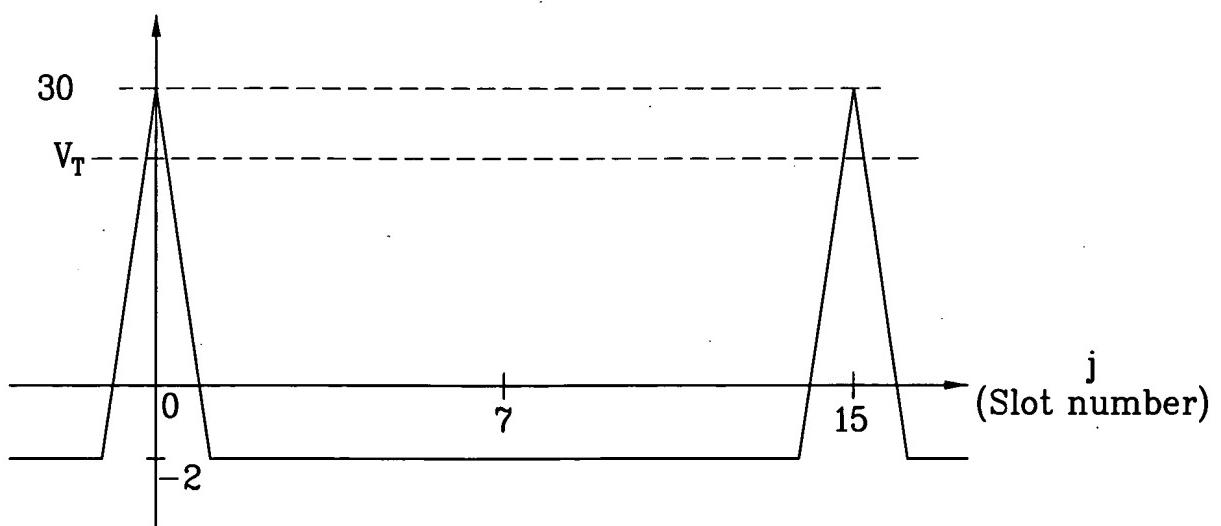


FIG. 36A

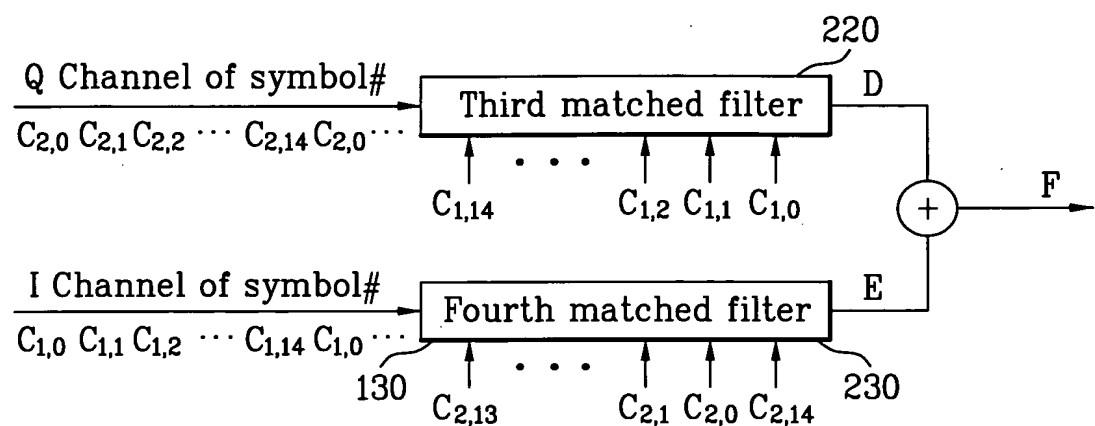


FIG. 36B

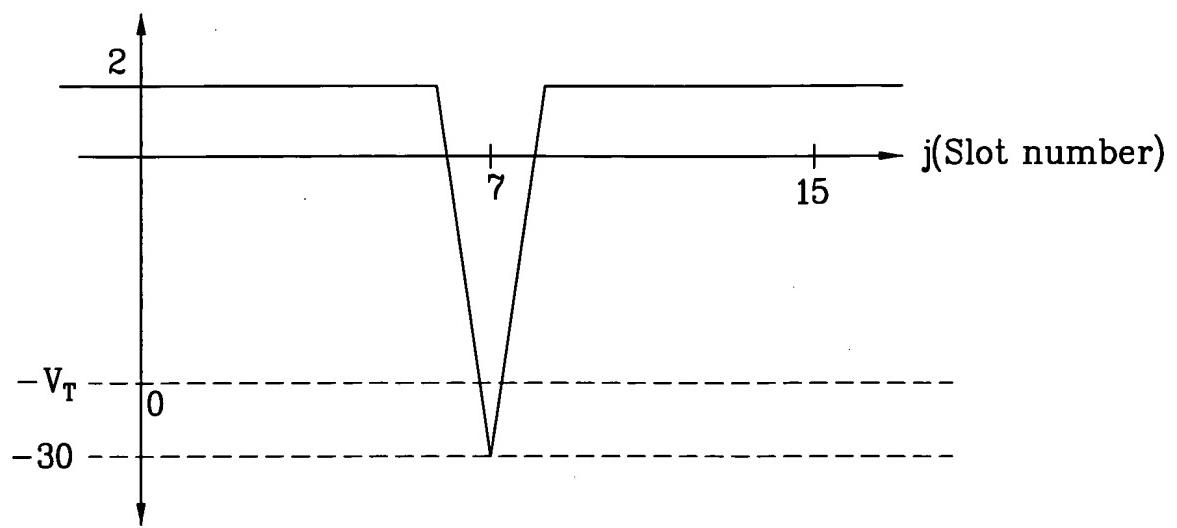


FIG. 37

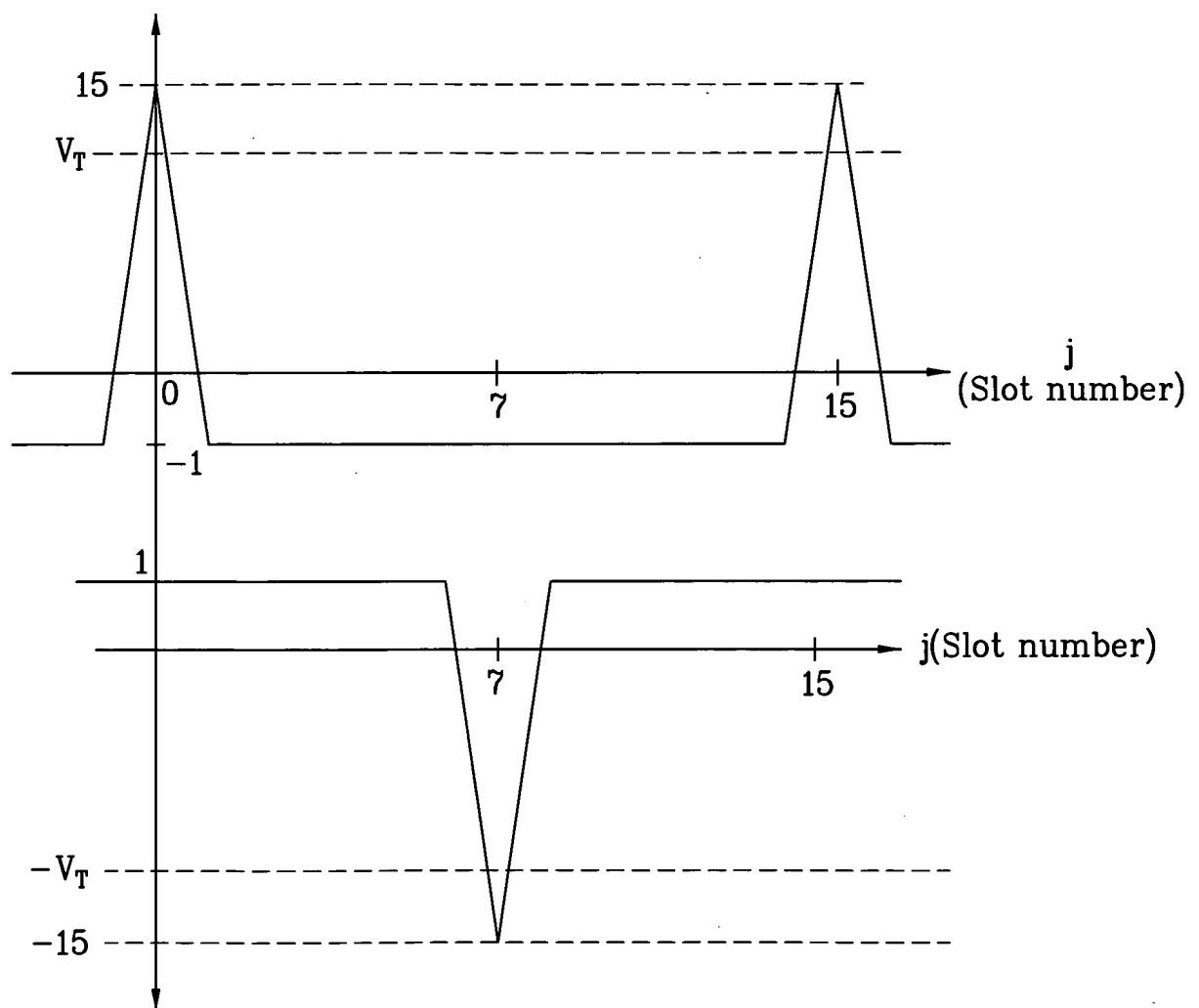


FIG. 38

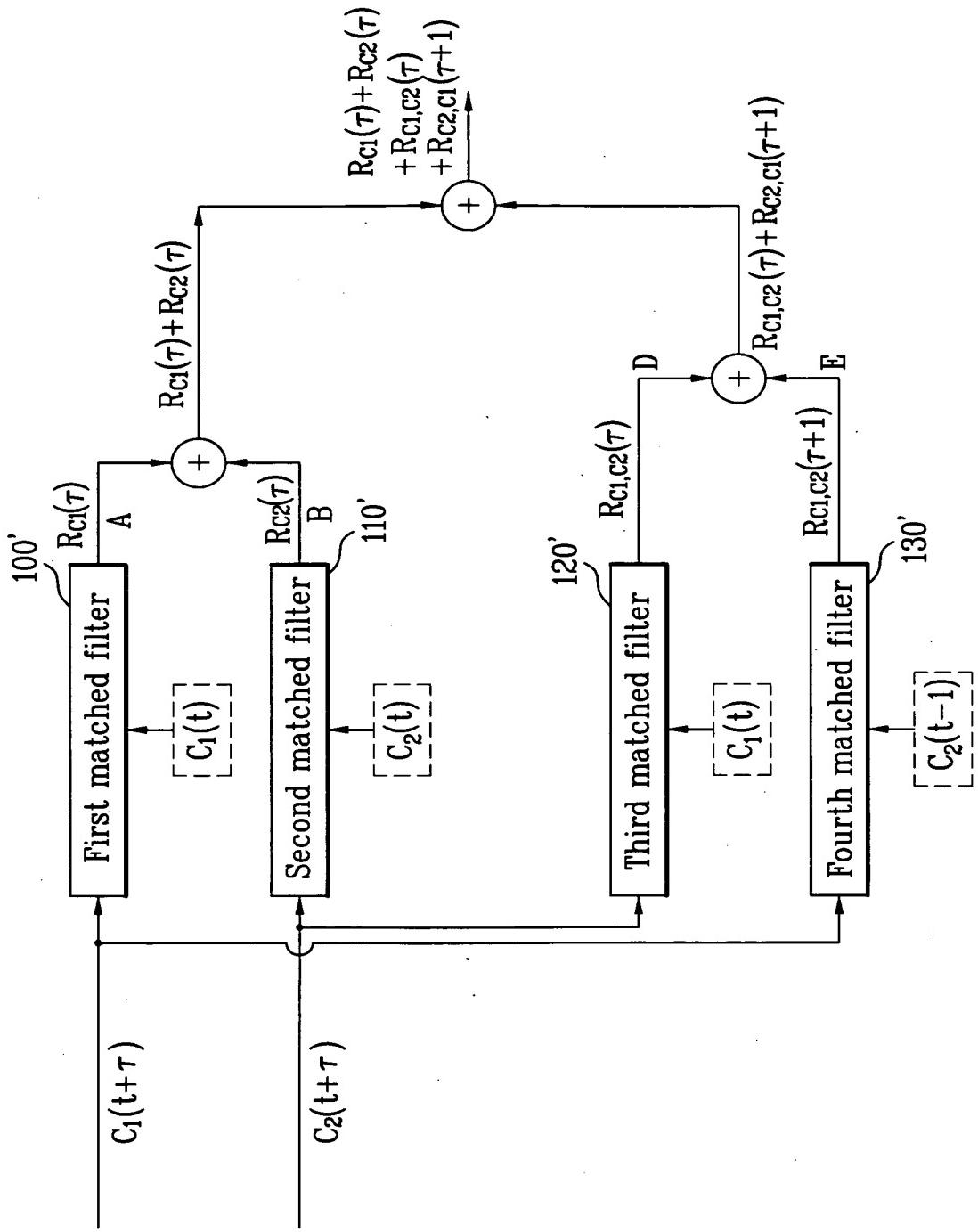


FIG. 39A

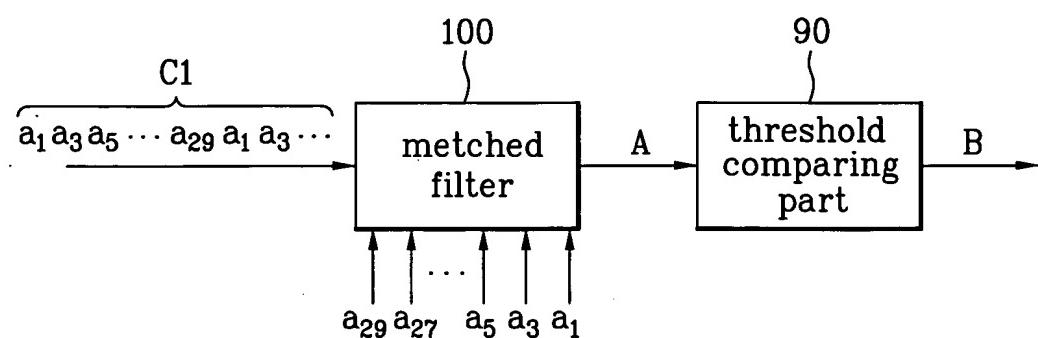


FIG. 39B

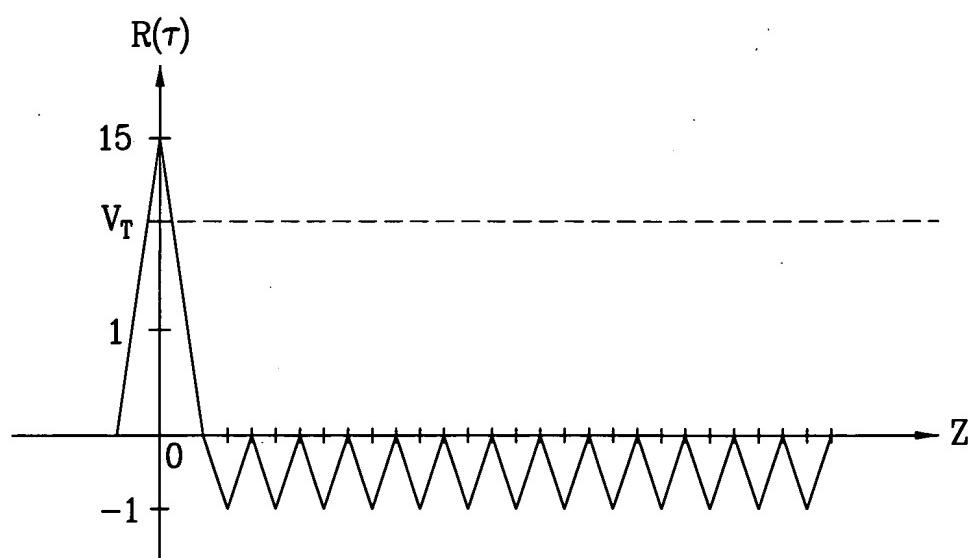


FIG. 40A

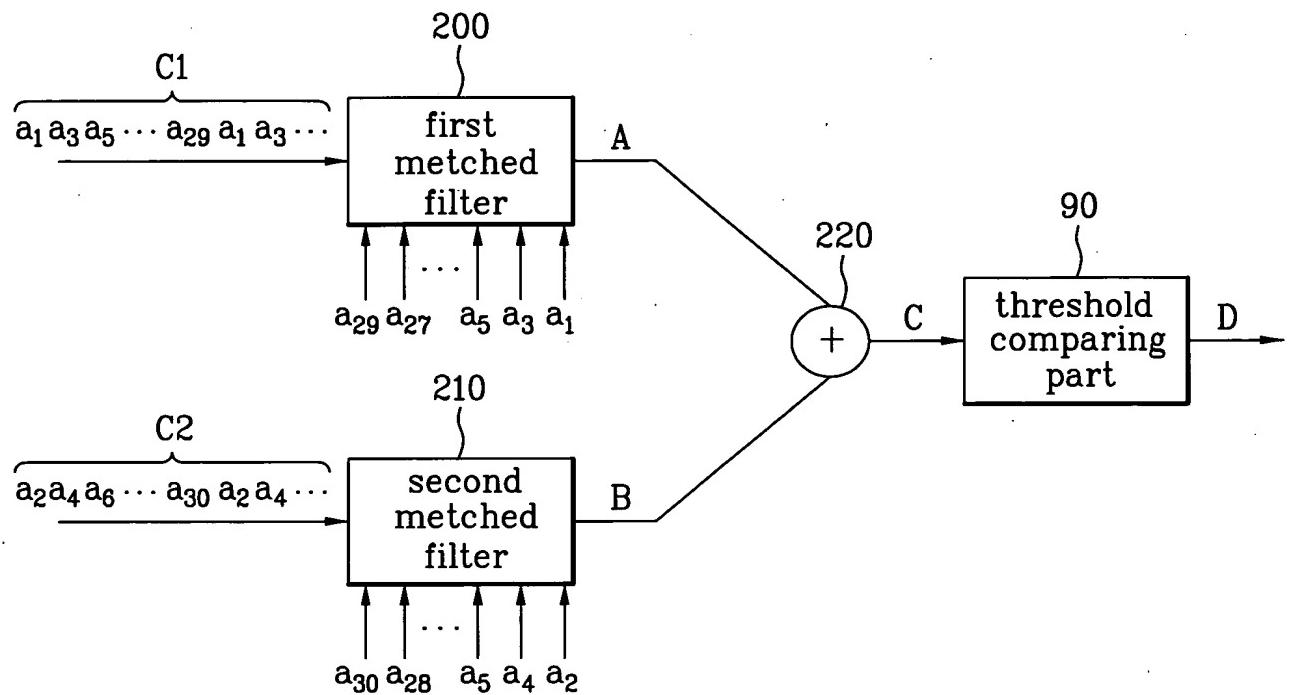


FIG. 40B

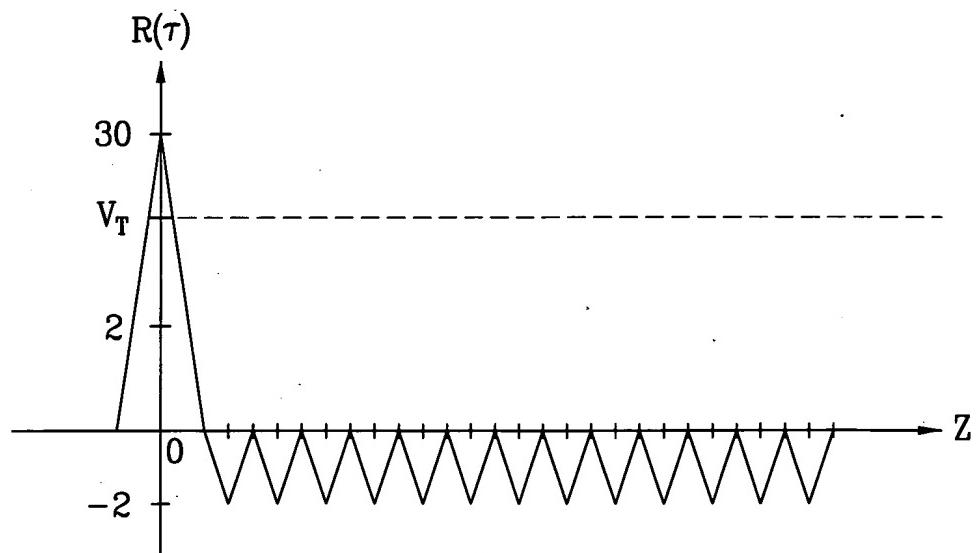


FIG. 41A

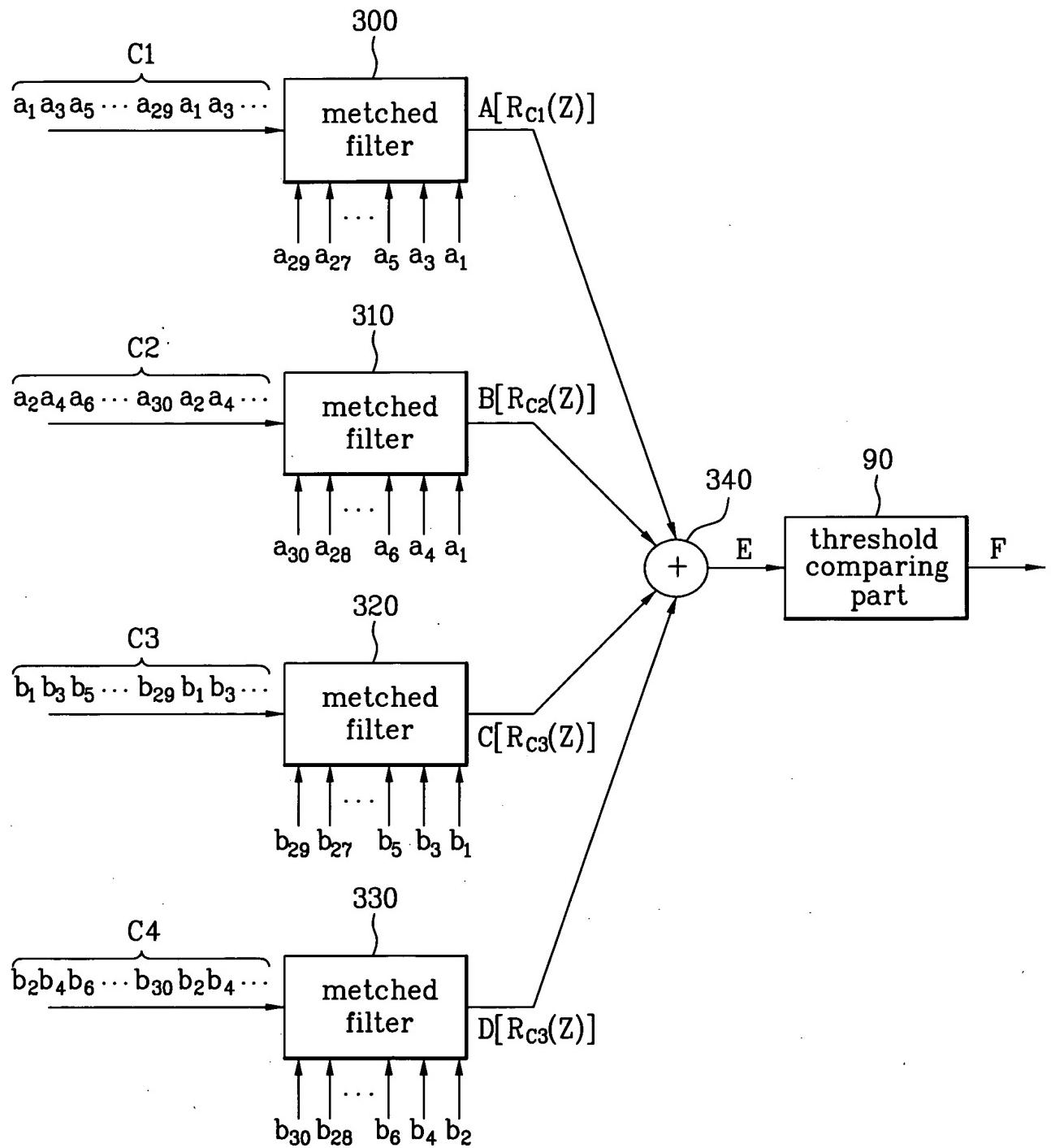


FIG. 41B

